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MISSION STATEMENT

The mission of Energy Regulation Quarterly (ERQ) is to provide a forum for debate and discussion on issues surrounding the regulated energy industries in Canada, including decisions of regulatory tribunals, related legislative and policy actions and initiatives and actions by regulated companies and stakeholders. The ERQ is intended to be balanced in its treatment of the issues. Authors are drawn principally from a roster of individuals with diverse backgrounds who are acknowledged leaders in the field of the regulated energy industries and whose contributions to the ERQ will express their independent views on the issues.

EDITORIAL POLICY

The ERQ is published online by the Canadian Gas Association (CGA) to create a better understanding of energy regulatory issues and trends in Canada.

The managing editors will work with CGA in the identification of themes and topics for each issue. They will author editorial opinions, select contributors, and edit contributions to ensure consistency of style and quality.

The ERQ will maintain a "roster" of contributors and supporters who have been invited by the managing editors to lend their names and their contributions to the publication. Individuals on the roster may be invited by the managing editors to author articles on particular topics or they may propose contributions at their own initiative. From time to time other individuals may also be invited to author articles. Some contributors may have been representing or otherwise associated with parties to a case on which they are providing comment. Where that is the case, notification to that effect will be provided by the editors in a footnote to the comment. The managing editors reserve to themselves responsibility for selecting items for publication.

The substantive content of individual articles is the sole responsibility of the contributors.

In the spirit of the intention to provide a forum for debate and discussion the ERQ invites readers to offer commentary on published articles and invites contributors to offer rebuttals where appropriate. Commentaries and rebuttals will be posted on the Energy Regulation Quarterly website (www.energyregulationquarterly.ca).

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Rowland J. Harrison, Q.C. and Gordon E. Kaiser
Managing Editors

As has been observed before in *Energy Regulation Quarterly*,[1] developments resulting from technological innovation in energy production and distribution raise important policy/regulatory issues. While in today's environment these issues usually do not attract the same level of public attention (or interest) as controversy surrounding infrastructure development and climate change, they nevertheless present significant challenges for energy policymakers and regulators.

Distributed energy resources are one such innovation. In their article "Distributed Energy Resource Development in Ontario: A Socio-Technical Transition in Progress?", Mark Winfield and Amanda Gelfant observe that, while distributed energy resources offer the potential to strengthen the sustainability of energy systems, their emergence also presents challenges for policy makers, regulators and actors in the electricity system. Ontario offers an important case study for exploring the tensions around their development.

"Innovation" (although not of the technological variety) is also central to the article by Michael Cleland and Tonja Leach titled "Much of Canada's Energy and Climate Challenge is Local — and so are Many of the Solutions." The authors argue that there needs to be a shift in the conversation to "Smart Energy Communities", with implications for the energy regulatory system. For example, while technological change is important, "what is missing from the technological conversation is a whole field of innovation concerned with the institutions that will oversee change and deployment of new technologies."

The highly controversial overhaul of the federal assessment process for reviewing energy and other development projects under federal jurisdiction, known as Bill C-69, is now law. Among other changes, the National Energy Board has been replaced by the Canada Energy Regulator, which, in only the first few weeks of its existence, was presented with a significant, and unprecedented, application to halt an open season process that had been initiated by Enbridge with a view to converting 90 per cent of the capacity of its mainline from common carrier to contract carriage. The changes implemented by the proclamation of Bill C-69 (which encompass more than the assessment process for infrastructure projects as such) are reviewed in "Bill C-69: Introducing the Canadian Energy Regulator and the Impact Assessment Agency", by Evan W. Dixon, Brittney N. LaBranche, Brendan K. Downey and Mike B. Chernos.

As announced in the last issue, *ERQ* is presenting a series of interviews with the chairs of Canada's public utility tribunals. The second written interview in the series, with Jocelin Dumas, Chair of the Quebec Régie de l'énergie, is presented in this issue of *ERQ*. Readers are reminded that other non-written interviews in the series are posted periodically as podcasts on the *ERQ* website.[2]

Ahmad Faruqui reviews *The Grid: The Fraying Wires Between Americans and Our Energy Future*, by Gretchen Bakke. Bakke teaches cultural anthropology at McGill and brings a new perspective to an important subject that has been widely discussed in scholarly and trade journals. Faruqui reports that, not surprisingly, her book has garnered the favourable attention

[1] See, for example, the editorial in Volume 6, Issue 3 and Adonis Yatchew's article in the same issue on the *ERQ* website, "Should Ratepayers Fund Innovation?", online: <http://www.energyregulationquarterly.ca/articles/should-ratepayers-fund-innovation#sthash.AjYeKINf.dpbs>.

[2] *ERQ* website, "Chairs Interviews' Series", online: <http://www.energyregulationquarterly.ca/chairs-interviews-series#sthash.2yhbkRcs.dpbs>.

of The Wall Street Journal and the National Post and that the author has appeared on NPR. However, he concludes that "a book which had begun on a promising note, takes its reader on a journey that abounds in sweeping generalizations, unsupported statements, conjecture and speculation."

One of our Managing Editors, Rowland Harrison, reviews *BREAKDOWN: The Pipeline Debate and the Threat to Canada's Future*, by Dennis McConaghy. *BREAKDOWN* is the sequel to McConaghy's 2017 *DYSFUNCTION: Canada after Keystone XL*. It details events that occurred primarily within Canada from late 2015 to the end of 2018, a period of intense regulatory, political, legal and other developments related to proposals to expand export market access for Canada's oil and natural gas resources. ■

DISTRIBUTED ENERGY RESOURCE DEVELOPMENT IN ONTARIO: A SOCIO-TECHNICAL TRANSITION IN PROGRESS?

Mark Winfield and Amanda Gelfant***

INTRODUCTION

Distributed Energy Resources (DERs) are drawing the attention of energy system operators and regulators across North America and Europe. DERs are "a decentralized source of energy that provides electricity services to individual customers or to the wider system located nearby."[1] DERs are often sited near customers and "provide all or some of their [customers] immediate electric and power needs and can be used by the system to either reduce demand or provide supply to satisfy energy, capacity, or ancillary service needs of the distribution grid."[2] DERs involve the integration of a of range technologies, including solar photovoltaic, wind power, cogeneration, renewable natural gas, energy storage, and electric vehicles, into stable and reliable energy resources at a local level.

Taken together, DERs have the potential to improve the sustainability of energy systems, by being able to make better use of renewable low-carbon energy resources, and improving system reliability and resiliency through the use of distributed and technologically diverse energy sources.[3] DERs are anticipated to have greater ability to adapt to changing circumstances, and have the potential to offer greater control to consumers.[4] DERs may also allow the deferral of costly infrastructure upgrades and potentially contribute to the reduction of "transmission and distribution bottlenecks and congestion."[5]

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[1] Government of Ontario, Ministry of Energy, *Ontario's Long-Term Energy Plan: Delivering Fairness and Choice*, (Queen's Printer for Ontario, 2017) at 68.

[2] The National Association of Regulatory Utility Commissioners, "Distributed Energy Resources Rate Design and Compensation" (2016) at 45.

[3] Pepermans, G., Driesen, J., Haeseldonckx, D., Belmans, R. and D'haeseleer, W., "Distributed generation: definition, benefits and issues", *Energy Policy*, 33:6 (2005) at 787–798; US Department of Energy, *The Potential Benefits of Distributed Generation and the Rate-Related Issues That May Impede Its Expansion*, DOE 2007; J. Marsden, "Distributed Generation Systems: A New Paradigm for Sustainable Energy," in *IEEE Green Technologies Conference (IEEE-Green)*, Baton Rouge, LA, 2011.

[4] *Ibid*.

[5] Mudathir Funsho Akorede, Hashim Hizam and Edris Pouresmaeil, "Distributed Energy Resources and Benefits to the Environment," *Renewable and Sustainable Energy Reviews* 14(2) (2010) 724 at 725.

While DERs offer the potential to strengthen the sustainability of energy systems, their emergence is seen to present a number of potential challenges. Widespread deployment of DERs requires the reconfiguration of transmission and distribution systems from relatively hierarchical structures connecting generators to consumers into networked configurations facilitating energy transactions among participants who may act as generators or consumers depending on their circumstances. Potential DER developers are searching for sustainable business models that enable them to aggregate their distributed, small-scale generation and storage resources into manageable revenue generating grid-scale assets.

The potential roll-out of significant amounts of DERs may present some challenges for the current system. For electricity systems that rely on large-scale, centralized generation assets, like nuclear, large fossil fuel-fired and hydroelectric power plants, widespread adoption of DERs have the potential to erode their traditional baseload grid demand, which, in turn, risks "stranding" those long-lived generating facilities.[6] In addition, the potential roll-out of DER's has sparked debate about how, and by whom, the costs of the necessary upgrades to transmission and distribution infrastructure, that larger-scale DER deployment would require, should be covered.[7]

The Province of Ontario offers an important case study for exploring these tensions around DER development. There is increasing recognition among the province's regulators, policymakers, and major actors in the electricity system of DER activity as a key focal point of innovation in the electricity sector. There is also an awareness that other jurisdictions are moving forward on DER development, and a recognition of the potential for DER deployment to have a momentum of its own, independent of the policy decisions made by governments and regulators.[8] Interest in DERs is reinforced by concerns over the regional impacts of climate change, particularly extreme weather events, and a growing emphasis on the reliability and resiliency of traditional electric grids and energy services.

At the same time, the province has a deeply embedded centralized electricity generation and transmission infrastructure, elements of whose centrality to the province's electricity system is being reinforced by a combination of explicit policy decisions and changing relationships between the province and generators. In this context, there are emerging concerns over potential stranding of centralized assets, due to a combination of factors, including weak demand growth, driven by structural economic change and improved end-use efficiency, and the potential impacts of a DER revolution. These considerations could result in efforts to constrain, either through slow movement in the modification of the existing regulatory and policy regime, or more explicit measures, to limit DER development to protect incumbent centralized assets. It's unclear at this stage what path the province will take. Will DER development remain constrained to experimental "sandboxes" at the margins of the system, or will it be allowed to play a more central role in the province's future energy framework?

This paper employs a socio-technical transition framework to help understand and analyze these dynamics, and assess their direction in Ontario.

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[6] Brian Rivard, "Don't leave me stranded: What to do with Ontario's Global Adjustment", *Ivey School of Business, Energy Policy and Management Centre*, (July 2019); See also Bruce Cameron, Richard Carlson and James Coons, "Canada's Energy Transition: Evolution or Revolution" (Toronto and Ottawa: Pollution Probe and QUEST, 2019), online:<https://www.pollutionprobe.org/wp-content/uploads/QUEST_Pollution-Probe-Policy-Innovation-Report.pdf>.

[7] J. Brooks, "Should limits be placed on DERs", *Ontario News: Association of Independent Power Producers of Ontario* (2019), online: <https://magazine.appro.org/news/ontario-news/5964-1566177328-should-limits-be-placed-on-ders.html>; Paul B. Sommerville, "Distributed Energy Resources: The Role of Regional Planning, New Benefit-Cost Methodologies and the Competitive Landscape" *Toronto Mowat Centre*, 2019, online:<https://munkschool.utoronto.ca/mowatcentre/wp-content/uploads/publications/190_OTG_distributed_energy_resources.pdf>.

[8] "Structural Options for Ontario's Electricity System in a High DER Future", *Energy Transformation Network of Ontario (ETNO)* (Toronto: IESO, June, 2019) 8 at 21; *supra* note 6 *Canada's Energy Transition*.

UNDERSTANDING ENERGY SYSTEM TRANSITIONS: SOCIO-TECHNICAL TRANSITION THEORY

Socio-technical transition theory examines "mechanisms through which socio-economic, biological and technological systems adapt to changes, in their internal and external environments."[9] Socio-technical transition evolved from "technology innovation and diffusion, evolutionary economics, and the sociology of large technical systems, to provide a framework for understanding how shifts in large and complex systems unfold."[10] The framework has been widely employed to understand the dynamics of technological and policy change in the energy sector.[11] Within socio-technical transition theory exists a framework called the Multi-Level Perspective (MLP). The MLP framework is used to examine the "process and development, and adoption of new technologies and their impacts on existing institutional, regulatory and technological systems."[12]

The MLP approach focuses on activities at three levels in the advancement of transitions: ***the niche***, ***the regime***, and ***the landscape***.[13] The niche level is where technological and policy innovation occurs. Niches take many forms — the activities of private sector start-ups, the research arms of existing utilities, or university laboratories. The ***regime*** level is where established actors, technologies and rules such as institutions, regulations, and policies operate.[14] The ***landscape*** level is used to define the exogenous environment.[15] Examples of landscape-level factors include the underlying economic structure of the jurisdiction in question, existing physical and technological configurations of energy systems, shifts in global markets, technological innovations, and external biophysical developments like climate change.

The interplay between the three levels can be summarized as follows: developments from within the niche, when coupled with changes in landscape, place pressure on the regime. If landscape-level pressures are significant enough they disrupt the existing regime, facilitating opportunities for niche-level developments to advance and be adopted into a reconfigured regime.[16]

Within the framework, there are four potential pathways that transitions are said to take.[17] The first is ***technological substitutions*** pathway; when an existing regime is dismantled by the deliberate introduction of new actors or technologies. Examples of this approach can include initiatives like the Feed-in-Tariffs (FIT), which were employed to encourage the development of renewable energy resources in Germany, Ontario and other jurisdictions.[18] The second potential pathway

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[9] Mary Lawhon and James Murphy, "Socio-technical regimes and sustainability transitions: Insights from political ecology", *Progress in Human Geography* 36(3),354-378, Originally from: Ron A. Boschma, and Jan G. Lambooy, "Evolutionary economics and economic geography", *Journal of Evolutionary Economics*, 9 (1999) 411-429.

[10] Stephen McCauley and Jennie C. Stephens, "Green Energy Clusters and Socio-technical Transitions: Analysis of Sustainable Energy Cluster for Regional Economic Development in Central Massachusetts USA", *Sustainability Science*, 7(2) (July 2012) 213 at 214.

[11] See, for example, Frank W. Geels, Florian Kern, Gerhard Fuchs, Nele Hinderer, Gregor Kungl, Josephine Mylan, Mario Neukirch and Sandra Wassermann, "The enactment of socio-technical transition pathways: A reformulated typology and a comparative multi-level analysis of the German and UK low-carbon electricity transitions (1990-2014)", *Research Policy*, 45:4, (2016) 896-913; Daniel Rosenbloom, and James Meadowcroft, "The journey towards decarbonization: Exploring socio-technical transitions in the electricity sector in the province of Ontario (1885-2013) and potential low-carbon pathways" *Energy Policy* (2014) 65 at 670-679.

[12] Mark Winfield, Shahab Shokrzadeh and Adam Jones, "Energy policy regime change and advanced energy storage: A comparative analysis" *Energy Policy*, 115 (2018) 572 at 573.

[13] Frank W. Geels, "The multi-level perspective on sustainability transitions: Response to seven criticisms", *Environmental Innovation and Societal Transitions*,1:1 (2011) 24 at 26.

[14] Frank W. Geels and Johan Schot, "Typology of sociotechnical transition pathways", *Research Policy* 36(3) (2007) 399-417.

[15] *Ibid*.

[16] *Supra* note 13 at 27-28.

[17] *Supra* note 11 Geels et.al.

[18] *Ibid*; Toby D. Couture, Karlynn Cory, Claire Kreycik and Emily Williams, "Policymaker's Guide to Feed-in Tariff Policy Design", *National Renewable Energy Laboratory, U.S. Dept. of Energy*, 2010.

is a ***transformation***. Transformation occurs when a regime gradually incorporates new niche level developments without significantly disrupting its existing structure.[19] The third pathway is called ***reconfigurations***. Reconfigurations happen when the influx of new technology leads to structural adjustments within the regime, due to the pressure from the landscape.[20] ***De-alignments and re-alignments*** are the fourth possible pathway occurring when the regime is disrupted by external pressure from innovators within the niche, who emerge and force the regime to reconfigure.[21]

This paper describes the existing situation at the landscape, regime, and niche levels and explores the responses of the regime to these pressures, and assesses the prospects for a significant transition in the Ontario electricity system in the direction of DERs.

ONTARIO ELECTRICITY SYSTEM AT THREE LEVELS

The Landscape

The existing system context and configuration

Ontario's existing electricity system is dominated by nuclear energy, with three facilities (Pickering (6 units + 2 retired), Bruce (8 units) and Darlington (4 units)) accounting over 61 percent of annual output (147.6 TWh in 2018) in energy terms.[22] All three facilities are owned by Ontario Power Generation (OPG), a provincially-owned corporation that assumed control of the former Crown utility Ontario Hydro's generating assets when the latter was broken up in the late 1990s. The Bruce facility is operated by a private consortium named Bruce Power.

Approximately 25 per cent of energy output is provided by 66 legacy hydro-electric assets with a total capacity of 7,475 MW.[23] These facilities are almost exclusively owned and operated by OPG. Many have undergone modernizations and upgrades over the past fifteen years. A phase-out of coal-fired generation, propelled by a combination of concerns over air quality and greenhouse gas emission impacts, was completed in 2014. The province's five Ontario Hydro/OPG-owned coal-fired facilities had provided up to 25 per cent of the system's electricity output in the late 1990s and early 2000s.[24]

As part of the coal phase-out, a large (approx. 10,000 MW) fleet of new gas-fired generation has been contracted by the province. These facilities were constructed and are operated by private third parties from the mid-2000s onwards. A review of the installed capacity (approximately 27 per cent of the province's total) versus annual energy output from gas-fired facilities (approximately 6 per cent of total)[25] reflects the consideration that the use of gas-fired generating capacity has been limited to back-up and gap filling functions, with the implication that these facilities may still have long operating lives ahead of them. The oldest of these facilities are beginning to come off their original contracts with the Ontario Power Authority and its successor the Independent Electricity System Operator (IESO).[26] The original contracts were structured around capacity payments ensuring that the capital costs of facility construction will be retired at the end of these contracts, regardless of facility utilization rates.

From a starting point of virtually zero installed capacity, approximately 4500 MW of new wind, and 450 MW of new solar capacity have been developed since 2005, by third

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[19] *Supra* note 11 Geels, et.al.

[20] *Ibid.*

[21] *Ibid.*

[22] "Media. Year-End Data, Supply", *Independent Electricity System Operator (IESO)*, online:<http://www.ieso.ca/en/Corporate-IESO/Media/Year-End-Data>.

[23] "Hydroelectric Power", *Ontario Power Generation*, online: <https://www.opg.com/powering-ontario/our-generation/hydro>.

[24] Government of Ontario, "The End of Coal", Environment and Energy, online:<https://www.ontario.ca/page/end-coal>.

[25] "Supply Overview: Transmission Connected Generation", *The Independent Electricity System Operator*, online: <http://www.ieso.ca/en/Power-Data/Supply-Overview/Transmission-Connected-Generation> (accessed October 30, 2019).

[26] "Technical Planning Conference Presentation", *The Independent Electricity System Operator*, September 13, 2018, Slides 39 and 42, online: <http://ieso.ca/Sector-Participants/Planning-and-Forecasting/Technical-Planning-Conference>.

parties. These developments occurred through the combination of the now terminated feed-in-tariff (FIT) program under the 2009 *Green Economy and Green Energy Act*, and competitive RFP-based procurements.[27] Some of the earliest of these procurements are also approaching the ends of their original contracts.

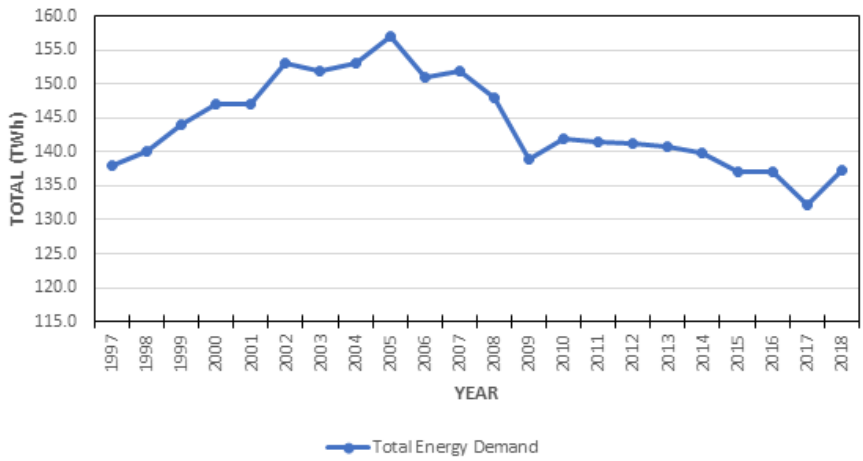
The province's nuclear fleet is at end-of-life. One nuclear plant (Pickering) is to be retired by 2024, while the Bruce and Darlington facilities are scheduled to undergo refurbishments.[28] The province's transmission infrastructure, operated by the partially privatized utility Hydro One, remains largely configured around major centralized generating facilities and is not well configured to support DER deployment. The same can be said of the province's distribution networks, which are mostly operated by municipally-owned Local Distribution Companies (LDCs).[29] Hydro One also handles distribution to some large industrial consumers, as well as commercial, farm and residential consumers in rural areas.

As shown in **Figure 1**, electricity demand in the province peaked in the mid-2000s[30] and has declined since then, despite continuing growth in the province's population and economy. The situation has been attributed in large part to economic restructuring away from energy-intensive manufacturing and resource extraction and processing activities, towards less energy-intense service, knowledge and information-based activities.[31]

The impact of conservation programs put in place since 2003 has also been a significant factor.[32]

Partially as a result of consistent over-projections of future demand growth, Ontario carries a surplus of generating capacity. In 2018, the province exported 18.6 TWh of electricity, often at low or even negative prices.[34] Expectations

Figure 1: Total Annual Electricity Demand (in TWh) 1997-2018 [33]



[27] *Supra* note 11, Rosenbloom and Meadowcroft.

[28] Government of Ontario Ministry of Energy, "Ontario's Long-Term Energy Plan: Delivering Fairness and Choice", *Queen's Printer for Ontario*, 2017 at 45.

[29] *Supra* note 8, ETNO.

[30] "Demand Overview Historical Demand", *Independent Electricity System Operator*, online: <http://www.ieso.ca/en/Power-Data/Demand-Overview/Historical-Demand>.

[31] Ontario, Ministry of Finance, "Ontario's Long-Term Report on the Economy" (Toronto: Queen's Printer, 2014), online: <https://www.fin.gov.on.ca/en/economy/ltr/2014/ltr2014.pdf>. See also Mark S. Winfield, "Electricity Planning and Sustainability Assessment: The Ontario Experience," for R.B. Gibson, ed. *Sustainability Assessment: Applications*. (London: Earthscan 2016).

[32] Environmental Commissioner of Ontario, "Energy Conservation Report" 2019 (Toronto: ECO, 2019); Independent Electricity System Operator, "Technical Planning Conference Presentation," September 13, 2018, Slide 23.

[33] Data from IESO, "Power Data: Historical Demand", online: <http://www.ieso.ca/en/Power-Data/Demand-Overview/Historical-Demand>.

[34] "Supply Overview : Imports and Exports", *Independent Electricity System Operator*, online: <http://www.ieso.ca/en/Power-Data/Supply-Overview/Imports-and-Exports>.

of demand growth due to the electrification of transportation and building and water heating as part of low-carbon transition responses to climate change are not being realized, in part due to the Ford government's pull-back on the previous government's climate change strategy.[35] The availability of lower-cost natural gas options for space and water heating relative to electrification has also been a factor.[36]

The overall landscape, with a large portion of supply provided by legacy and long-lived hydro-electric and nuclear generating assets, a large fleet of relatively new gas-fired generating capacity, and flat demand growth, leaves little room for new entrants or technologies in the system.

Landscape-level developments

Beyond the flattening of demand growth as a result of economic restructuring and conservation initiatives, there are other landscape-level developments that have the potential to disrupt the regime. The regional impacts of climate change are recognized within the province, particularly with respect to the increased occurrence of extreme weather events, including heat- waves, ice storms, and intense precipitation. These developments have lead to increased concerns over resiliency of the electricity system in the face of extreme weather. These concerns have been reinforced by weather-related events like the 2003 eastern North American blackout, 2013 Toronto ice storm,[37] and the September 2019 impacts of Hurricane Dorian in Atlantic Canada.[38]

In addition, public concerns over rising electricity bills, largely reflecting the costs of rebuilding a system in which many generating, transmission and distribution assets had been subject to under-investments in maintenance and were approaching end-of-life, have become a major political issue in the province. This has led to strong pressures to reduce consumers' bills in the short term, and may provide incentives to consumers, both large and small, to minimize their reliance on the provincial system in the longer term.[39]

Finally, and perhaps most importantly, the emergence of DERs themselves represents a potentially significant landscape-level development. DERs reflect the convergence of three major technological revolutions in the electricity sector over the past decade. These include: the improved technical and economic performance of renewable energy sources; the emergence of advanced energy storage technologies; and the application of information technology and communications technologies to grid management and control (a.k.a. smart grids).[40]

This technological convergence offers the potential to integrate locally distributed and controlled generation and storage assets into reliable electricity supplies, with the role of grid supply rendered residual or even redundant. Such developments, could lead to significant reductions in grid demand that would potentially "strand" large, centralized and long-lived generating and transmission assets. Stranding could occur, if there is insufficient demand for outputs and services, which would typically generate revenues to pay down capital investments for construction or refurbishment or operating and maintenance costs. Such situations lead operators to increase their rates, prompting further defections from the grid by their remaining consumers. This scenario is sometimes referred to as a "utility death spiral."[41]

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[35] Environmental Commissioner of Ontario, "Climate Action in Ontario: What's Next"? *2018 Greenhouse Gas Progress Report*, (Toronto: ECO 2018).

[36] Ontario Energy Board, "Historical Natural Gas Rates", online: <https://www.oeb.ca/rates-and-your-bill/natural-gas-rates/historical-natural-gas-rates>.

[37] US Environmental Protection Agency, "Climate Change Impacts: Climate Impacts on Energy", online: <https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-energy.html> (accessed October 30, 2019). See also ECO, *Facing Climate Change: 2016 Greenhouse Gas Progress Report* (Toronto: ECO, 2016).

[38] CBC, "Tens of thousands in Atlantic Canada still in the dark after Hurricane Dorian," September 9, 2019, online: <https://www.cbc.ca/news/canada/nova-scotia/tens-of-thousands-still-in-the-dark-after-hurricane-dorian-1.5275706>.

[39] Mark Winfield, "Ontario's hydro: some unwelcome truths", *Policy Options*, 2018, online: <https://policyoptions.irpp.org/magazines/may-2018/ontarios-hydro-unwelcome-truths>.

[40] *Supra* note 12.

[41] Stephen Lacey, "This is what the Utility Death Spiral Looks Like", *Greentech Media*, March 2014, online: <https://www.greentechmedia.com/articles/read/this-is-what-the-utility-death-spiral-looks-like>.

In Ontario, the need to be able to deal with high seasonal space heating and cooling needs, among other things, mean that full self-generation and disconnection scenarios seem unlikely for residential and small/medium commercial consumers except in high grid-connection cost rural settings.[42] Moreover, DER development may offer opportunities for distribution system operators like Ontario's LDCs. DER deployment depends on the ability to coordinate and aggregate resources across a network to provide stable and reliable supply. The transactions needed to make such systems viable will have to occur over distribution system operator (DSO) networks. Business models for DSOs to recover the system upgrade and operating and maintenance costs required to play these roles remain uncertain but seem to be emerging.[43] Ontario LDCs are already signalling their interest in playing the role of DER enablers through their distribution networks.[44] At the same time, the movement towards reducing the role of the commodity portion of electricity bills relative to the "fixed charge" portion for maintaining a grid connection may remove incentives for DER development, conservation and innovation more generally.[45] The declining portion of the bill related to consumption reduces the potential savings to consumers that could flow from pursuing these types of options.

Outside of Ontario, the U S, Federal Energy Regulatory Commission (FERC) and some US states are recognizing DER aggregators as a distinct class of market participants.[46] Within Ontario, third party organizers/aggregators of behind the meter (BTM) DER activities for large industrial and commercial consumers are emerging in response to demand response (DR) and "GA-Busting" opportunities, developments discussed in greater detail below as niche-level activities.

The Regime

Ontario's electricity sector has never been subject to a clearly defined long-term planning or regulatory framework. The current regime flows from adoption of a "hybrid" system containing market and planning elements, including the creation of a provincial-level system planning agency (the Ontario Power Authority (OPA) — whose functions are now carried out by the IESO) in the aftermath of a failed experiment with competitive wholesale and retail markets in the early 2000s. Since the collapse of the OPA-led Integrated Power System Planning (IPSP) process at the end of the last decade, the system has shifted towards a paradigm of increasingly explicit political management.[47]

The shift towards a political management model was formalized under the Wynne government through the adoption of Bill 135 (2016).[48] The Bill removed the requirement of legislation adopted in 2004[49] that the OPA/IESO develop IPSPs and those plans be subject to formal review by the Ontario Energy Board (OEB). Rather overall system planning

[42] See, for example, Nicole Mortillaro, "Why living 'off the grid' isn't possible for most Canadians", *Global News*, July 16, 2016, online: <https://globalnews.ca/news/2819121/why-living-off-the-grid-isnt-possible-for-most-canadians>.

[43] Natanel Lev, "Towards Decentralized Power Systems: Market & Regulatory Frameworks for Ontario", MES/JD Major Research Paper, Faculty of Environmental Studies, York University, May 2019, online: <https://sei.info.yorku.ca/files/2019/05/Lev_MRP_Final.pdf>. See also Ignacio Perez-Arriaga and Christopher Knittel, "Utility of the Future: An MIT Energy Initiative Response to an Industry in Transition" (Cambridge MA: MIT, 2016), online: <https://energy.mit.edu/wp-content/uploads/2016/12/Utility-of-the-Future-Full-Report.pdf>.

[44] Navigant, "The Power to Connect".

[45] Ontario Energy Board, "Board Policy: A New Distribution Rate Design for Residential Electricity Customers," April 2015, online: <https://www.oeb.ca/oeb/_Documents/EB-2012-0410/OEB_Distribution_Rate_Design_Policy_20150402.pdf>. On the implications of this development see Julia Zeeman, "Emerging Business Models for Local Distribution Companies in Ontario," (Toronto: Faculty of Environmental Studies, 2016), online: <https://sei.info.yorku.ca/files/2016/09/MRP_-JZEEMAN_2016_Final-.pdf>.

[46] Federal Energy Regulatory Commission (FERC), "Electric Storage Participation in Markets Operated by RTOs and ISOs", Washington DC, 2016.

[47] MacWhirter, R., and Mark S. Winfield, "Competing paradigms, policy windows and the Search for Sustainability in Ontario Electricity Policy," in G.Albo and R.MacDermid eds., *Divided Province: Ontario Politics in the Age of Neoliberalism*, Kingston/Montreal: Queens-McGill University Press 2019). See also G.Veigh, *Energy Policy – Transition Briefing* "Establishing greater evidence-based analysis of Ontario's energy procurement" (Toronto: On360, 2018), online: <https://on360.ca/30-30/ontario-360-reforming-ontarios-energy-policy-transition-briefing>.

[48] *The Energy Statute Law Amendment Act*, 2016, S.O. 2016, c 10.

[49] *The Electricity Restructuring Act*, 2004, S.O., c 23.

decisions are now made at the political level, and the resulting Long-Term Energy Plans are not subject to any meaningful regulatory oversight or approval. The energy plans are then implemented via directives from the Minister of Energy to the major institutional actors in the system, particularly the OEB and IESO.[50]

The Ontario Energy Board operates under the authority of the *Ontario Energy Board Act*, 1998 and the *Electricity Act*, 1998. The Board is responsible for, among many other things, rate-setting and licensing, and approving all licenses for any market participant in the province, including the IESO.[51] In practice, this means that the OEB has some control over what goes onto the electricity rate base, and therefore the economic viability of new technologies and business models, as well as the entry of new actors into the system. This authority is subject to very high levels of political control.

The Independent Electricity System Operator (IESO) of Ontario, created by the *Electricity Act*, 1998, acts as Ontario's electricity system and market operator, which manages the integrated power system and serves as the supervisor of the wholesale market in Ontario.[52] The services the IESO provides across the electricity sector are: "managing the power system in real-time, planning for Ontario's future energy needs and enabling conservation and designing a more efficient electricity marketplace to support sector evolution."[53] In addition to operating the system on a day-to-day basis, the IESO has some role in forward planning, although, that function is constrained by the highly politized decision-making processes that define the system.

As noted earlier, the system is dominated by large centralized generating asset owners and operators (e.g. OPG (nuclear and hydro)), Bruce Power (nuclear) as well as developers of new gas-fired generation, with some additional new entrants through the pre-2014 renewable energy development programs.

Not surprisingly in this context, the existing regime rules are generally oriented towards large centralized generation. The existing rules did not anticipate the possibility of the large-scale deployment of DERs, or their underlying new technologies such as advanced energy storage.[54]

The municipally-owned LDCs operate the distribution networks in most cities and towns, giving them direct relationships with residential, commercial and institutional consumers. The LDCs had taken on substantial roles in delivery of conservation programming for residential and commercial customers from 2004 onwards. Those roles were terminated by the provincial government in March 2019.[55] The LDC sector has been undergoing a high degree of consolidation.[56] One result of this trend has been the emergence of some larger LDCs with substantially higher technical and policy capacity and interest in innovation than their predecessors. Among other things, has been reflected in discussion papers from the Electricity Distributors' Association exploring the potential roles of LDCs as DER enablers and developers. There have also been a number of DER pilot projects on the part of individual LDCs.[57]

Niche-Level Developments

Within the MLP framework, the niche level is where innovation and development occur. The niche is seen to provide spaces in which new ideas and products are protected from market selection pressures.[58] The technologies

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[50] *Supra* note 47 MacWhirter and Winfield. See also *supra* note 47 G.Veigh.

[51] Ron Clark, Scott Stoll, Fred D. Cass, "Ontario Energy Law: Electricity", *LexisNexis Canada Inc.*, December 2012, at 312.

[52] *Ibid* at 309.

[53] "Connecting Today, and Powering Tomorrow", *Independent Electricity System Operator*, online: <http://www.ieso.ca>.

[54] *Supra* note 12.

[55] Minister of Energy, Northern Development and Mines, "Minister's Directive: Discontinuation of the Conservation First Framework", March 29, 2019, online:<http://www.ieso.ca/en/Corporate-IESO/Ministerial-Directives>.

[56] Mowat Energy, "Background Report on the Ontario Energy Sector" (Toronto: Mowat Centre, 2016), Ch.3, online: <https://munkschool.utoronto.ca/mowatcentre/wp-content/uploads/publications/134_EET_background_report_on_the_ontario_energy-sector.pdf>.

[57] See, for example, Alectra Utilities *Power House*, online: <https://www.powerstream.ca/innovation/power-house.html>.

[58] Frank W Geels, "Socio-technical Transitions to Sustainability: The Multi-level perspective and policy implications", *Manchester Institute of Innovation Research*, Manchester University, August 2013 at 15.

and practices created at the niche level may the potential to penetrate the regime by offering novel, and beneficial alternatives to current approaches.

Ontario has a hybrid planning/market electricity structure and relatively complex institutional landscape left in the aftermath of successive restructurings of the electricity system. These unique dynamics have, largely unintentionally, created a niche-rich environment for technological, policy and business model innovation.[59]

Potential niches for DER related development have emerged in a number of locations through the system. These include the recently established ancillary services and demand response markets, the activities of LDCs, and potentially most significantly the opportunity to offer "GA-busting" services to large industrial consumers.

Ancillary services are used in the province to guarantee the reliability of the IESO grid.[60] The IESO currently contracts for four ancillary services: certified black start facilities; regulation service; reactive support and voltage control service; and reliability must-run.[61] DER options provided by third parties may offer alternatives to current ancillary service technologies with a promise of low carbon performance and resiliency.[62] The demand response auction, in place since 2017, provided opportunities to aggregate demand response resources, principally from large industrial and commercial consumers.[63]

Within the Ontario LDC community, some operators have begun to examine practical barriers to DER integration. Alectra Utilities, for example, has several pilot projects dedicated to smart grid technologies and is currently hosting a microgrid demonstration project. Alectra also has initiated a project called "Power House" which seeks to "evaluate the integration of solar storage on residential homes."[64]

Third parties have the flexibility to create solutions to DER barriers that LDCs would otherwise be restricted to via policy, regulations or legislation. In Ontario, niche-level actors who work at the distribution level offer software platforms that integrate DERs (e.g., Powerconsumer Inc.) and transactive energy platforms (e.g., Opus One).

The province's rate structure for large industrial consumers (i.e. over five MW peak demand) provides an additional important opportunity for niche-level activities. In addition to the market price (Hourly Ontario Energy Price (HOEP)) for electricity, since 2005 Ontario electricity consumers have paid a Global Adjustment (GA) fee. The GA is used to cover the costs of capital investments in the system, including nuclear refurbishments, capacity payments under natural gas generator contracts, and FIT contracts for renewable generators.[65] Until March 2019 conservation programs were also financed through the GA. The GA has emerged as the largest contributor to the commodity portion of consumers' electricity bills.[66]

In June 2011, the government implemented the Industrial Conservation Initiative (ICI). Under the program, large industrial consumers can avoid having to pay the GA portion of their bills if they can reduce their electricity

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[59] Mark Winfield and Scott Weiler, "Institutional diversity, policy niches, and smart grids: A review of the evolution of Smart Grid policy and practice in Ontario, Canada", *Renewable and Sustainable Energy Reviews*, 82(P2) (2018), 1931-1938.

[60] Hamidreza Zareipour, Claudio A. Canizares and Kankar Bhattacharya,"The Operation of Ontario's Competitive Electricity Market: Overview, Experiences, and Lessons", *IEEE Transactions on Power Systems*, 22:4, November 2007 at 6.

[61] IESO, "Markets and Related Programs, Ancillary Services Market", online: <http://www.ieso.ca/en/Sector-Participants/Market-Operations/Markets-and-Related-Programs/Ancillary-Services-Market>.

[62] International Renewable Energy Agency, "Innovative Ancillary Services: Innovation Landscape Brief", 2019, online: <https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Feb/IRENA_Innovative_ancillary_services_2019.pdf?la=en&hash=F3D83E86922DEED7AA3DE3091F3E49460C9EC1A0> at 12.

[63] "Markets and Related Programs: Demand Response Auction", *Independent Electricity System Operator*, online: <http://www.ieso.ca/en/Sector-Participants/Market-Operations/Markets-and-Related-Programs/Demand-Response-Auction>.

[64] Innovation at Alectra Utilities, *Power House*, online:<https://www.powerstream.ca/innovation/power-house.html>.

[65] Brian Rivard, "Don't leave me stranded: What to do with Ontario's Global Adjustment", *Ivey School of Business, Energy Policy and Management CentrePolicy Brief*, July 2019 at 2.

[66] See "Price Overview: Global Adjustment", *Independent Electricity System Operator*, online: <http://www.ieso.ca/en/Power-Data/Price-Overview/Global-Adjustment>.

consumption by twenty five per cent during the five peak system demand hours of the year.[67] The rate structure has provided an opportunity to "GA-bust" by investing in or contracting behind-the-meter generation or storage to reduce their grid demand while maintaining operations during the periods of peak system demand.[68] A market has also emerged for software programs that offer predictive modelling and analytics designed for GA-busting.[69] The exact extent of "GA-busting" services and technologies being provided in the province is unknown, although it is widely thought to be substantial.[70]

THE ONTARIO REGIME'S RESPONSES TO LANDSCAPE PRESSURES AND NICHE-LEVEL DEVELOPMENTS

The direction of the existing regime is dominated by the province's decisions to pursue multi-billion dollar refurbishment projects of the Bruce and Darlington nuclear stations between 2016 and 2033, along with the extension of the life of the Pickering facility, originally scheduled to close in 2018, to 2024.[71]

The primary planned response to the retirements of the Pickering facility and Bruce and Darlington refurbishments is the development of an incremental capacity market. [72] The impact of this on DER development is unclear, although US experiences suggest the market is likely to be dominated by existing gas-fired assets and leave little room for innovation or new entrants.[73]

At the same time, the IESO and OEB have undertaken a number of initiatives intended to examine barriers to DER development in Ontario. Their activities seem to flow from sensitivity to long-standing criticism that the existing regime is not innovation-friendly. There is also recognition that other jurisdiction in North America moving past Ontario in terms of DER development and policies.

The IESO

In June 2019, the Energy Transformation Network of Ontario issued a report titled "*Structural Options for Ontario's Electricity System in a High DER Future*."[74] The report is designed to address "…options for the allocation of roles and responsibilities for DERs in Ontario."[75] The report also examines "…the potential for conflicts of interest and synergies among the roles and responsibilities required for DER integration into Ontario's electricity system, and existing entities in Ontario's electricity sector."[76] One of the major issues in the report "…is the question of who should own, operate, buy and sell, services related to DERs."[77]

In particular, the report raised the question of the role of LDCs in DER development and of how, or whether, an LDC operates in the DER space. The role of LDCs as DER developers has emerged as a significant point of controversy. As

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[67] *Supra* note 65 at 4.

[68] *Ibid*.

[69] For example, see Powerconsumer Inc., online: <https://www.powerconsumer.com>.

[70] Jason Deign, "Batteries Benefit From Ontario's Bizarre Energy Market", *Greentechmedia*, June 3, 2019, online: <https://www.greentechmedia.com/articles/read/batteries-benefit-from-ontarios-bizarre-energy-market>.

[71] "Ontario Moving Forward with Nuclear Refurbishment at Darlington and Pursuing Continued Operations at Pickering to 2024", *Independent Electricity System Operator*, January 1, 2016, online: <http://www.ieso.ca/en/Corporate-IESO/Media/News-Releases/2016/01/Ont-Moving-Forward-with-Nuclear-Refurb-at-Darl-and-Pursuing-Continued-Ops-at-Pickering-to-2024>.

[72] "Incremental Capacity Auction High-Level Design", *Independent Electricity System Operator*, (Toronto: IESO, 2019), online: <http://www.ieso.ca/en/Market-Renewal/High-Level-Designs/Incremental-Capacity-Auction-High-Level-Design>.

[73] Adlar Gross, "Distributed Energy Resources (DER) and Energy Storage Capacity Markets: Experience from the US and Implications for Ontario's Incremental Capacity Auction" (2019) York University Working Paper, online: <https://sei.info.yorku.ca/files/2019/06/Capacity-Market-Working-Paper-June-2019.pdf>.

[74] *Supra* note 8 at 1.

[75] *Ibid*.

[76] *Ibid*.

[77] "Exploring Models for the Effective Integration of DERs", *Independent Electricity System Operator*, June 2019, online: <http://ieso.ca/en/Powering-Tomorrow/Technology/Exploring-models-for-the-effective-integration-of-DERs>.

DSOs, the LDCs are seen to have potentially significant competitive advantages, if not natural monopolies, in the DER space.

In August 2019, the IESO announced an intention to test the province's first Local Electricity Market (LEM). According to the IESO, the benefits of the LEM are:

> The local electricity market will allow resources like solar panels, energy storage, and consumers capable of reducing their electricity use to compete to be available during periods of high demand. Leveraging existing local resources could help avoid the need to invest in new transmission lines and stations, while competition will drive down costs.[78]

The IESO is beta testing the LEM. If it is successful, the project would lend itself to a larger-scale implementation. At the same time, it begs questions about the relative roles of the IESO and LDCs in facilitating DER development.

The OEB

In March 2019, the OEB initiated a consultation process dedicated to "develop a comprehensive regulatory framework that facilitates investment and operation of DERs on the basis of value to consumers and supports effective DER integration…"[79] A notable step toward the intent to fully embrace DERs and innovation, in general, is the recently announced OEB Sandbox.

The purpose of an innovation sandbox is to allow the OEB to provide an "accessible way…to support innovators to test new ideas, products, services, and business models in the electricity and natural gas sectors."[80] The OEB has committed to continuous reporting on the results of the sandbox. To date, the OEB has indicated that the majority of the sandbox participants are interested in learning about regulatory barriers to their projects.[81] With regards to regulatory barriers, the sandbox has limited authority to offer exemptions or workarounds.

One of the goals of the innovation sandbox is to assist the OEB in understanding what is happening in the niche, but also to potentially consider changes to the current regulatory structure.[82]

The Provincial Government.

The refurbishments of the Bruce and Darlington nuclear facilities and the "life-extension" of the Pickering facility provided the centrepieces of the previous Liberal government's 2017 Long-Term Energy Plan. However, there was also an emphasis on facilitating innovation, and specific references to grid modernization, energy storage, EV integration and DERs.[83]

There were also some surprising references to energy storage, smart grids and DERs in the new Progressive Conservative provincial government's December 2018 Made in Ontario Environment Plan.[84] The document was otherwise primarily concerned with dismantling the previous government's cap and trade system for GHG emissions.[85] The

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[78] "Demonstration Project to Test Ontario's First Electricity Market", *Independent Electricity System Operator*, August 29, 2019, online: <http://www.ieso.ca/en/Corporate-IESO/Media/News-Releases/2019/08/IESO-Demonstration-Project-to-Test-Ontarios-First-Local-Electricity-Market>.

[79] Ontario Energy Board (OEB), "Responding to Distributed Energy Resources" (DERs) (Toronto: OEB March 2019 onwards), online: <https://www.oeb.ca/industry/policy-initiatives-and-consultations/responding-distributed-energy-resources-ders>.

[80] Ontario Energy Board (OEB), "OEB Innovation Sandbox: What is the Innovation Sandbox?", online: <https://www.oeb.ca/_html/sandbox/index.php#>.

[81] Ontario Energy Board (OEB), "OEB Innovation Sandbox: Reporting", online:<https://www.oeb.ca/_html/sandbox/reporting.php>.

[82] Ontario Energy Board (OEB),"OEB Innovation Sandbox FAQ", online:<https://www.oeb.ca/_html/sandbox/faq.php>.

[83] Government of Ontario, "2017 Long-Term Energy Plan: Delivering Fairness and Choice", Chapter 3, online: <https://www.ontario.ca/document/2017-long-term-energy-plan/chapter-3-innovating-meet-future>.

[84] Ministry of the Environment, Conservation and Parks, "Preserving and Protecting our Environment for Future Generations", (Ontario. Queen's Printer. 2018), online: <https://www.ontario.ca/page/made-in-ontario-environment-plan>.

[85] Mark Winfield, "The Ontario Climate Change Plan: An Assessment", online: <http://marksw.blog.yorku.ca/2018/12/03/the-ontario-climate-change-plan-an-assessment>.

province has yet to follow-up on DER related elements of the plan.

DISCUSSION AND ANALYSIS: A TRANSFORMATION OR RECONFIGURATION?

The MLP framework suggests that the development of DERs in the niche, combined with landscape pressures in the province, could facilitate a transition within the regime. However, how the process will play out in Ontario remains an open question.

The existing regime actors, in the forms of the OEB, IESO, LDCs and Ministry of Energy, Northern Development and Mines have all demonstrated interest in DER development, recognizing it as a major point of technological innovation in the sector. Substantial niche-level activity is occurring in the province around DERs and their underlying technologies through a variety of venues. These include LDCs, third-party entrepreneurs engaged in GA-busting, demand response and ancillary market activities, as well as IESO sponsored initiatives. At the same time, the primary direction of the regime remains oriented towards the refurbishment of nuclear assets. That, along with the dominant role existing natural gas-fired facilities are likely to play in the proposed incremental capacity market, and flat demand growth, seems to leave little room for larger-scale DER development.

While the regime is seeking to enable DERs at the margin, a deliberate **technological substitution** strategy is not being pursued. Rather the regime seems to want what Geels et.al. term a **transformation**. Such an approach envisions an embedding of the new DER technologies into existing system where they provide obvious benefits, while maintaining the roles and viability of the existing major actors such as OPG, Hydro One, the LDCs, and gas developers/operators. The regime's commitments to nuclear refurbishments and the existence of a large, underutilized gas-fired generating fleet reinforce its sensitivity to risks of asset stranding if DERs deployment becomes too successful.

The unknown landscape-level variable in this equation is whether DER development becomes a force unto itself, which will happen regardless of what the regime does — a **reconfiguration** or **re-alignment**, in the terms of Geels et.al., as have been seen in sectors like music (MP3), accommodations (AirBnB), and taxi services (Uber).

Pilot projects like the Alectra Powerhouse suggest that the enabling technologies for large scale DER deployment are available in the forms low-cost small scale renewable generation technologies, scalable advanced storage, and the necessary control and integration technologies.

The primary limiting technological factor is the need to upgrade distribution-level systems and their management and control systems to enable DER development.

Behind that factor is the need for business models that generate enough revenues to justify the necessary investments in distribution infrastructure. To some degree, such models seem to be emerging for third party developers in the large industrial and commercial sectors in the areas of DR aggregation, and behind the meter "GA-busting" services.

The situation in the residential and small commercial market is more complex. The base of large numbers of small consumers requires higher levels of aggregation than single or small numbers of large consumers to provide useful services and resources. Ontario's LDCs have been signaling their interest in playing these roles, although the regulatory and business models for them to do so have yet to be defined.[86] Moreover, there are debates over the extent to which LDCs should be limited to providing basic infrastructure versus playing an active role DER development and management, potentially in competition with third-party providers.

[86] Navigant Research, "The Power to Connect."

Residential and small business consumer attitudes towards DERs are still at a formative stage, although it can be expected that cost, reliability, and resiliency benefits will be important considerations.[87] For potential third-party providers, who will fall in the categories of new entrants and start-ups, there is an additional question of whether residential/small commercial consumers will accept them as DER providers given the poor history of electricity retailers in Ontario.[88] There are also more general growing public concerns over data security and privacy.[89] LDCs may emerge as the default DER developers at the residential/commercial level given their relatively strong trust ties to the customer bases, reputation for long-term stability, institutional capacity to identify, finance and operate the required infrastructure, and the consideration that they operate under a clear legislative regime around privacy and data access issues through the *Municipal Freedom of Information and Protection of Privacy Act*.[90] Third party DER aggregators may find partnerships with LDCs the best option in this context.

CONCLUSIONS

There are three possible outcomes for DERs. The first is the regime will attempt to limit DER development by failing to enable the infrastructure upgrades need to support DER deployment beyond the pilot or 'sandbox' stages. That option would leave the province relying principally on legacy nuclear, gas and hydro assets, maintaining the status quo. The second possibility is that DERs will become so desirable and accessible to consumers they will become an unstoppable force — a **re-alignment** or **reconfiguration** in socio-technical transition terms. The third possibility is a **transformation** along the lines of what seems to be envisioned by the existing regime, although the business and regulatory pathways for DERs beyond the niche remain uncertain.

More widely there remains in Ontario an underlying problem of the lack of any framework for these types of discussions about the future structure of the province's electricity system to occur. The IESO, OEB, EDA and others around have initiated a series of *ad hoc* processes around DER development. However, in the absence of any overall long-term planning framework there is no regular public process for the consideration of the impacts and opportunities presented by emerging technological developments, and other landscape-level challenges for the system. Without such structures, these challenges will continue to be dealt with on an *ad hoc* basis, to the long-term detriment to the system as a site for innovation, and in terms of its economic and environmental sustainability. ■

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[87] Canadian research on consumer acceptance of DERs is limited. On energy storage, see Gaede, J., C. R. Jones, S. Ganowski, and I. H. Rowlands, "Understanding lay-public perceptions of energy storage technologies: Preliminary results of a questionnaire conducted in Canada", *Energy Reports*, 2019 (in press), online: <https://uwaterloo.ca/social-acceptance-of-energy-storage-systems/publications/understanding-lay-public-perceptions-energy-storage-0>. On consumer acceptance on DERs generally, *see* Marteen Wolsink, "The Research Agenda on Social Acceptance of Distributed Generation in Smart Grids: Renewable as Common Pool Resources", *Renewable and Sustainable Energy Reviews*, 16:1 (January 2012), 822; Soland, M., Loosli, S., Koch, J. et al. "Acceptance among residential electricity consumers regarding scenarios of a transformed energy system in Switzerland — a focus group study," *Energy Efficiency*, (2018) 11: 1673, online: <https://doi.org/10.1007/s12053-017-9548-x>.

[88] *See* Donald N. Dewees, "Ontario's Retail Energy Sector: Market Evolution, Market Data and Consumer Protection", Presentation to OEB, December 8, 2014, online: <https://www.oeb.ca/oeb/_Documents/EB-2014-0158/ECPA_Review_Presentation_Dewees.pdf>.

[89] Re: the Sidewalk Labs initiative in Toronto, Laura Bliss, "How Smart Should a City Be? Toronto Is Finding Out" *Citylab*, September 7, 2019, online: <https://www.citylab.com/design/2018/09/how-smart-should-a-city-be-toronto-is-finding-out/569116/>. See also Ontario Information and Privacy Commissioner, "Building Privacy into Ontario's Smart Meter Data Management System: A Control Framework" (Toronto: IPC 2012).

[90] *Municipal Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, c M.56.

MUCH OF CANADA'S ENERGY AND CLIMATE CHALLENGE IS LOCAL – AND SO ARE MANY OF THE SOLUTIONS

Michael Cleland and Tonja Leach

INTRODUCTION – SMART ENERGY COMMUNITIES AND THE REGULATORY SYSTEM

Canada faces several challenges on the energy and climate change front — and they appear to be growing more intractable. We are approaching thirty years from initial agreement on the Framework Convention on Climate Change in Rio in 1992 and the energy and climate discussion in Canada has resulted in, at best, limited action on greenhouse gas emissions while simultaneously generating a great deal of rancor and division and undercutting both consumer and investor confidence.

The trajectory of this debate is hurting Canada in numerous ways which will be familiar to any follower of either traditional or social media. All the while there is a badly underappreciated aspect of the debate which holds promise of changing that trajectory. We call this "Smart Energy Communities."

Community in this context is intended to mean a geographical, administrative and political entity. In formal legal terms, it can be governed as a municipal unit or under an indigenous authority. It can be anything from a metropolitan entity to a remote or rural community and everything in between.

A "Smart" Energy Community starts by understanding all its energy needs and sources, both external and internal and how those are balanced. The following chart showing energy flows in the Town of Oakville illustrates by example what all Smart Energy Communities take as their starting point. A Smart Energy Community aims to integrate a system-wide understanding of how energy can be used most efficiently with local, renewable, and conventional sources and recognizes that citizens want action to reduce greenhouse gas emissions built on energy fundamentals including safety, reliability, security, resilience and affordability.[1] In short, a Smart Energy Community understands the compelling challenge of climate change while recognizing the reality of community energy needs and priorities.

By shifting the conversation toward Smart Energy Communities we start talking about what matters to Canadians in their day to day lives — more sustainable energy systems, new economic opportunities, improved local environmental quality, more resilient infrastructure, and affordability. This shift has the potential to make energy and climate policy constructive and concrete as opposed to a sometimes abstract, almost always divisive political debate.

For the energy regulatory system, the idea of focusing on Smart Energy Communities has several implications:

> It raises numerous questions about how the (mainly downstream) regulatory system functions —

[1] Canada, Generation Energy Council, *Canada's Energy Transition: Getting to our Energy Future Together* (Report) (June 2018), online: <https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/CoucilReport_july4_EN_Web.pdf>.

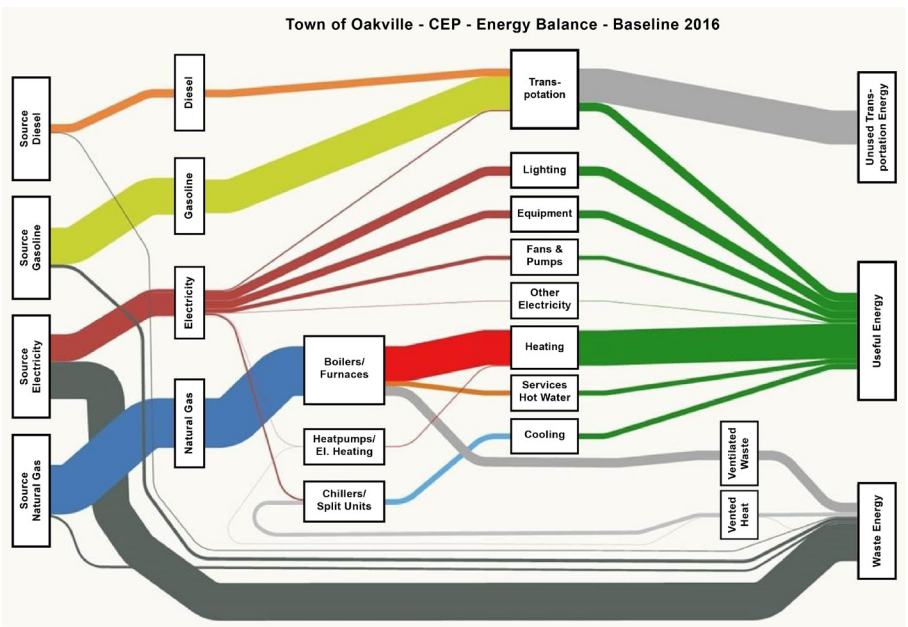
most obviously in terms of how distributed energy sources are integrated into and what value they offer to larger, traditional systems. In addition to how local load centers can function as sources; how individual building complexes integrating power, gas and heat systems are to be managed and regulated; how traditional regulated utilities work with new types of energy service providers; and how to enable change while maintaining reasonable costs and necessary reliability for customers.

A NEW WAY OF FRAMING THE ISSUE

As the energy and climate debate proceeds, it is commonplace to hear that systems-based approaches are needed — ones that account for the complex interactions among the various elements that serve the needs of citizens and the economy. But characteristically the conversation then turns back to individual "sectors" usually oil and gas and associated pipelines, electricity from centralized generation, or transportation.

In the past, the focus of the energy discourse at the local level has been mainly about individual building, equipment and vehicle energy efficiency. More recently it has come to encompass ideas for use of local energy sources and most recently to what extent and by what means much of future energy demand can be served solely by electricity generated by (presumably greenhouse gas neutral) sources. Smart Energy Communities involve a whole new concept beginning with an understanding (as noted above) of all local energy flows from source to end use, understanding how the basic physical structure of a community (notably land use and transportation systems) affect overall energy productivity, the potential for local sources to be integrated into the system, and an understanding that reliability is critical.

Image 1: Community energy flows[2]



[2] The community energy flows Sankey diagram was developed for the Town of Oakville as a visual representation of their energy sources, energy end-use and wasted energy. It was developed as a baseline to help them understand what the potential impact could be of their Community Energy Plan on energy use, emissions and energy costs. Reproduced with permission from the Town of Oakville.

There are many ways in which other parts of the energy economy might be approached more constructively by thinking of them as systems and how those systems, in turn, connect with others.

For example, the transport sector is most often treated as a distinct set of issues but the challenges and opportunities in local transport are distinct from those in long distance systems and questions about local transport are best embedded in the concept of Smart Energy Communities. For that matter transport and the controversies it generates is to all intents and purposes an integral part of the upstream oil and gas system. Transport is often the biggest inherent challenge facing other parts of the resource economy and it will soon come to dominate the upstream electric power discussion should Canada embark on a massive increase in power production as envisioned in much of the current climate debate.

The synergies among different systems (and the challenges presented to the realization of those synergies) also present opportunities for constructive debate and real solutions. An obvious one is how the further development of the resource economy might proceed in parallel with more efficient and cleaner energy solutions for rural and remote communities.

In any event, however the problem may be approached, it is inescapable that much of the energy future is to be found in Canadian communities whether large urban, medium, small rural, remote, resource-based or Indigenous. It is in communities where Canada uses approximately 60 per cent of its energy and emits about half of its greenhouse gases.

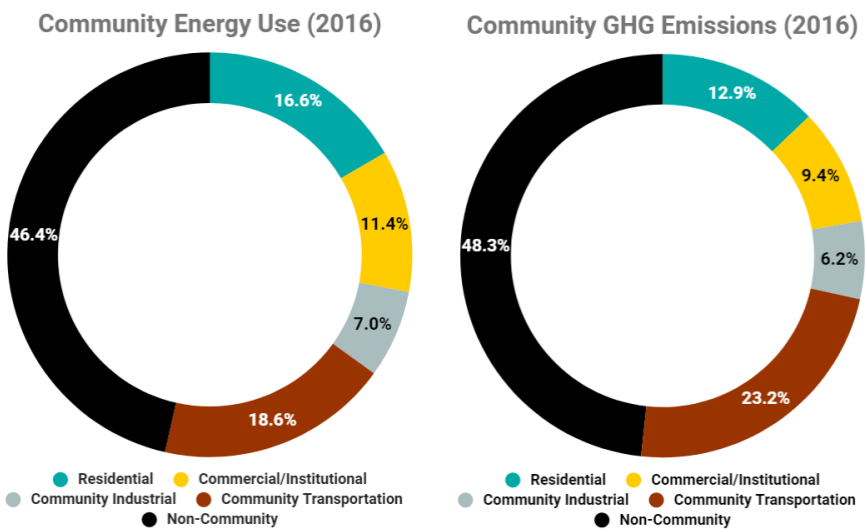
AND A NEW DIRECTION

We can frame the problem around six key challenges and why the idea of Smart Energy Communities offers real solutions. While these principles are aimed specifically at how best to approach things at the community level, they are broadly applicable to the larger energy and climate debate and might help Canadians to find more common ground on several fronts:

1. Building climate change policy on a foundation of sound energy policy

Almost thirty years of no significant results on greenhouse gas management should tell us something is wrong. Part of what is

Image 2: Community energy end use and emissions[3]



[3] Canada, Natural Resources Canada, *Comprehensive Energy Use Database*, online: <http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive_tables/list.cfm?wbdisable=true>.

wrong is that our climate aspirations stand precariously on a foundation of awareness of energy fundamentals that often range from incomplete, to wasteful and ineffective to, at worst, destructive of both public and investor confidence. Smart Energy Communities are founded on the recognition that energy consumers and citizens first value the fundamental integrity of their energy delivery systems: safe, reliable, secure, resilient and affordable. Beyond that, the evidence points to communities generally placing more weight on local environmental and social issues (impacts on air, water, land and cultural heritage) than on the abstract concept of climate.[4] Canadians want climate solutions but they want them built on secure foundations and that is where Smart Energy Communities fit in.

2. Driving technological change without selecting technology winners

The objective is results, not methods. We have no way of knowing exactly what technological solutions might underlie a low emissions Canada in mid-century. We need to better understand the potential impacts of different technological solutions on utilities and other energy service providers, consumers, and investors and not only for energy use and emissions but on the fundamental resilience of energy systems facing the effects of a changing climate.

Rather than pushing for the latest technology, policy needs to emphasize accurate and complete price signals, setting performance standards, creating conditions for investment in infrastructure, and inviting both consumers and investors to choose options based on their particular conditions at a given point in time. This principle is nowhere more evident than at the community level where local conditions are almost always unique whether due to different energy efficiency options, opportunities to manage waste heat, opportunities to make assets out of local, diverse local renewable energy options, and distinctive challenges respecting system resilience. Smart Energy Communities figure this out and select what works best for them.

3. Maximizing the value of all our assets, both existing and new

Electrification is no doubt a solution in several quarters but it may not be the best and is not obviously the only one, particularly in the medium term and we are far from understanding the diverse implications of electrifying the 80 per cent or so of energy end use that now relies on other sources but we do know it will be costly.[5] The established energy networks — electrical, natural gas, fuels for mobility — are with us for the foreseeable future and have many options for solid incremental improvement, especially building on the potential for diverse networks to work together. In any event, in a world where all the evidence tells us that new infrastructure will be difficult, risky and expensive, needing careful, deliberate discussion to bring citizens along and, inevitably, slow to build, we can't afford to waste what we have. Smart Energy Communities know this and use their assets accordingly.

4. Emphasizing institutional innovation

Technological change is clearly of immense importance and Canada is doing its share to create such change in our energy systems from upstream to down. But what is missing from the technological conversation is a whole field of innovation concerned with the institutions that will oversee change and deployment of new technologies. What are the right roles for local governments? How does a regulatory system that has served us well get a lot better, in terms of who decides and how, as well as how it adapts to the new business and regulatory models that follow from the emergence of new technological options?[6] How do policy makers find answers to these questions, answers which have the weight

[4] M. Cleland et al., "A Matter of Trust, The Role of Communities in Energy Decision Making" (November 2016), *Positive Energy, University of Ottawa*, online: <https://www.uottawa.ca/positive-energy/sites/www.uottawa.ca.positive-energy/files/mattertrust_report_24nov2016-1_web.pdf>.

[5] "Implications of Policy-Driven Electrification in Canada" (October 2019), *Canadian Gas Association*, online: <http://www.cga.ca/wp-content/uploads/2019/10/Implications-of-Policy-Driven-Electrification-in-Canada-Final-Report-October-2019.pdf>.

[6] Michael Cleland and Monica Gattinger, "Canada's Energy Future in an Age of Climate Change: Public Confidence and Institutional Foundations for Change" *Energy Regulation Quarterly*, 7:3 (October 2019), online: <http://www.energyregulationquarterly.ca/articles/canadas-energy-future-in-an-age-of-climate-change-public-confidence-and-institutional-foundations-for-change#sthash.31Rb1JAF.dpbs>.

of concurring citizens standing behind them? The local level holds promise for bringing all the relevant stakeholders together in ways that make the answers more apparent and with stronger and more widespread support.

5. Reducing policy uncertainty through alignment and sense of community

There is no easy answer to the apparent political polarization which has had Canada often grasping at oversimplified but politically attractive solutions and more recently swinging back and forth as governments change. The effects of all of this have been to increase citizen cynicism, undercut investor certainty and frustrate efforts at steady change. Local energy debates emphasizing all the energy related needs of local communities while adding to climate solutions and built around a shared sense of community can offer improved prospects for civil dialogue and more stable conditions for change. Smart Energy Communities, by definition, spend less time shouting at each other and more on building the future.

6. Restoring public trust and confidence in decision making institutions

Again, this is a very large question, one that extends far beyond energy and climate and it seems wise to be realistic in our aspirations. Many people and organizations are grappling with this problem and it will not be turned around quickly or easily. Still, it seems more likely that trust and confidence will be gradually restored if citizens can see progress through decision processes that engage them and their local communities in building solutions that meet all the requirements that they demand from their energy systems. Smart Energy Communities are also more energy literate communities and more likely to be constructive contributors to the larger energy decisions that occur outside their immediate areas of responsibility.

IMPLICATIONS FOR THE REGULATORY SYSTEM

Communities offer a fundamental solution to better manage our energy use and effectively reduce greenhouse gas emissions. Over the years, this idea has gained momentum.

There are multiple opportunities to be "smart." It starts with improving efficiency from individual buildings and equipment to whole sub-systems (neighbourhoods, building complexes, transportation systems). It ensures use of the right energy in the right place, such as avoiding wasteful use of high grade energy (electricity) in low grade applications (such as space heat) except where doing so facilitates use of local renewable sources. It understands the potential to manage waste heat and turn other waste such as from municipal landfills or industrial and agricultural operations into energy sources. It looks to the whole range of local renewable energy sources whether through rooftop solar or tapping local sources of thermal energy. And it ties it all together with integrated power, gas and heat grids.

Community energy planning is becoming a mainstream practice, most often built around basic energy and policy principles.[7] Through steady effort a national community of practice has emerged, centered on local energy planning and as of 2017, an 85 per cent increase in the number of community energy plans since 2014 to over 500 plans in place today.[8]

Through the course of these efforts there has also emerged a diverse network of over 5000 community leaders across sectoral, provincial, and territorial boundaries.[9] The process has engaged governments, regulators, utilities, land and building developers and various other community leaders. All of this provides a backdrop against which regulatory innovation can proceed.

A recently funded initiative which will be formally announced in January 2020,[10] aims

[7] "Principles for Smart Energy Communities" (2009) *QUEST*, online: <https://questcanada.org/pathways/>.

[8] "National Report on Community Energy Plan Implementation" (2017) *QUEST*, online: <https://questcanada.org/wp-content/uploads/2018/08/National-Report-on-Community-Energy-Plan-Implementation_Full_Report_2015.pdf>.

[9] "Our Smart Energy Impact" (2019) *QUEST*, online: <https://drive.google.com/file/d/1gp98HVri_qNMBARGK39NlGFLZl10xz1D/view>.

[10] The 'Energy Regulatory Innovation Sandboxes' is a joint initiative between Pollution Probe and QUEST which will be formally announced January 2020.

to support the establishment of what we call "Regulatory Innovation Sandboxes." These aim to provide a mechanism to test new business models, programs, and technologies that don't fit in current regulatory frameworks.

Sandboxes provide a mechanism to test new policies, programs, and technologies customized for each province, territory or local community in a controlled manner, where risks to consumers are minimized. Sandboxes will help energy stakeholders across Canada learn what works and what doesn't, and move effectively to a lower emissions energy system. In order to adapt to a changing energy system, there is a need to incubate "niches" (policy, regulatory and business models and processes, in addition to technology) that can provide the same energy services with lower emissions and with a lower cost or at greater convenience. Once such solutions are incubated, the policy and regulatory regime can evolve with the market to absorb them and, in the process, meet current and future needs.

Canada need not spend all its time in self-flagellation about past failures or single minded emphasis on aspects of the system such as upstream oil and gas where the potential for increased regional division creates fundamental threats to constructive discourse. By more visibly advancing Smart Energy Communities — something that is well in train across the country despite the general public unawareness — Canada can contribute constructively to a much more sustainable energy future, perhaps, lower the temperature of the debate and better position Canada in international discussions. Canada is not alone in facing these challenges; many countries are exploring means to shift away from big and long-distance energy infrastructure to increase emphasis on locally-created solutions. If Canada can demonstrate its own capacity to develop such solutions, its leadership could be of help to other countries where there are numerous barriers to big energy infrastructure and there is a need to find more practical and cost-effective local solutions. ■

BILL C-69: INTRODUCING THE CANADIAN ENERGY REGULATOR AND THE IMPACT ASSESSMENT AGENCY*

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On August 28, 2019, Bill C-69 was proclaimed into force, simultaneously enacting the *Canadian Energy Regulator Act* (**CERA**) and the *Impact Assessment Act* (**IAA**)[1] and repealing the *National Energy Board Act* (**NEB Act**) and the *Canadian Environmental Assessment Act, 2012* (**CEAA 2012**). Due to this legislative changeover, the National Energy Board (**NEB**) has been replaced with a new regulatory body, the Canadian Energy Regulator (**CER**); and the Canadian Environmental Assessment Agency (**CEA Agency**) has been replaced with the Impact Assessment Agency of Canada (**IA Agency**).

Bill C-69 introduces a number of important changes to the regulatory regime for major projects and environmental assessments in Canada.

AN OVERVIEW OF THE REGULATORY CHANGES ENACTED BY BILL C-69

Revised governance and adjudicative structure

Previously, the NEB administered its statutory jurisdiction as an integrated regulatory body. No longer. The CERA implements an internal reorganization, separating out the CER's administrative and adjudicative functions. Strategic administrative and policy considerations will be managed by a Board of Directors and a CEO; adjudicative functions will fall into the purview of a group of independent commissioners (the **Commission**).

In addition to these two bodies, the CERA contemplates that the Commission and IA Agency will, on occasion, form a federal review panel to jointly conduct integrated impact assessments and reviews of certain designated projects that are subject to both the CERA and the IAA.[2]

This change, though new in the CERA, is not unfamiliar. Prior to 2012, some project reviews were similarly conducted by federal joint review panels under the NEB Act and the *Canadian Environmental Assessment Act*, the predecessor statute to the CEAA 2012. After 2012, the NEB conducted the environmental assessments and project reviews for designated projects within its jurisdiction and the CEA Agency was responsible for those energy-related projects that the NEB did not have the jurisdiction to consider. Thus, while the decision-making apparatus set out in the CERA and the IAA represents a change from Canada's most recent approach to environmental and major project regulation, the involvement of a multi-agency review panel is, in some respects, no more than

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[1] *Canadian Energy Regulator Act and Impact Assessment Act*, forming part of Bill C-69, *An Act to enact the Impact Assessment Act and the Canadian Energy Regulator Act, to amend the Navigation Protection Act and to make consequential amendments to other Acts*, 1st Sess, 42nd Parl, 2019, cl 11, s 44 [the ***CERA*** and ***IAA***, respectively].

[2] *CERA*, ss 185, 263, 299.

a reversion to a process similar to that followed prior to 2012.

Jurisdiction of the CER

Under the CERA, the CER has retained, to varying degrees, jurisdiction over the "energy" industry in Canada, including a list of projects and associated matters similar to that previously overseen by the NEB, such as the environmental and economic regulation of pipelines and transmission infrastructure. Offshore renewable energy projects are a new addition to this list, and likely include projects such as offshore wind and tidal facilities. In its adjudicative role, the CERA tasks the Commission with reviewing applications for the development, construction and operation of many of these projects, as well as their ongoing "cradle-to-grave" regulation, culminating in their eventual abandonment.[3] Notwithstanding that the CER has jurisdiction over a broad range of projects and related issues, the remainder of this article focuses primarily on matters related to the oil and gas industry, and, in particular, the more complicated circumstances that engage both the CERA and the IAA.

Much of the media coverage of Bill C-69 focused on the regulatory review of oil and gas infrastructure projects and facilities. Regarding applications for new pipelines and associated facilities, the Commission will, unless otherwise directed, assess applications within its jurisdiction, considering a range of environmental and, broadly speaking, socio-economic factors. Some of the enumerated factors that fall within this list, like environmental impact, safety, and concern for the rights and interests of Indigenous peoples of Canada were previously considered implicitly by the NEB. Other factors are new, including the impact of a project on the intersection of sex and gender identity factors and the extent to which the project will hinder or contribute to the Government of Canada's ability to meet its environmental obligations and commitments in respect of climate change.

The economic regulation of pipelines and related infrastructure is an issue that has historically received significantly less media and public scrutiny. Nevertheless, it is an important element of industry regulation and will continue to form an integral part of the CER's regulatory mandate. And in light of the pipeline capacity constraints currently affecting the Canadian energy industry, economic regulation is a matter of increasing importance. Perhaps reflecting the wisdom lurking beneath the cliché "if it ain't broke, don't fix it," the CERA continues the traffic, toll, and tariff provisions from the NEB Act, leaving them relatively unchanged. As a result, we anticipate that the CER will adopt an approach to economic regulation similar to that of its predecessor.

Designated projects and the IA Agency

The IAA applies to a broad range of projects and physical activities. In this respect, there is some crossover with the CERA. The *Physical Activities Regulations* (the **Regulations**) to the IAA designates certain projects (**designated projects**) which will require an impact assessment as part of their regulatory review. A number of pipeline and other energy-related projects are included on this list and must therefore undergo integrated impact assessments and reviews conducted by a review panel. These include:

- pipelines in national parks and protected areas;
- interprovincial or international pipelines that require more than 75 km of new right of way; and
- certain offshore projects and operations related to offshore pipelines.

In addition to projects that are subject to the jurisdiction of both the CER and the IA Agency, the following energy-related projects must undergo impact assessments administered by the IA Agency:

- new fossil-fuel power generating facilities that generate more than 200 MW;
- new in situ oil sands mines that have bitumen production capacities of 2,000 cubic metres per day and are not subject to provincial legislation

[3] *Ibid*, ss 11(a) and (b).

limiting the amount of greenhouse gas emissions produced by oil sands sites in the province, as well as the expansion of certain existing mines; and

- certain refining, processing and storage facilities, as well as the expansion of existing designated facilities.

For both categories of designated project, proponents should be aware of the expanded criteria that will apply to any impact assessment conducted by a review panel or the IA Agency, including the newly framed public interest determination. As is the case as between the CERA and the NEB Act, the IAA has a far broader list of factors than was formerly included in the CEAA 2012, which focused primarily on environmental effects. In this regard, the explicit reference to "impact" in the title of the IAA is telling: the IAA requires a consideration of the overall societal impact that a project may have, either as a direct or consequential result of its construction and operation and including environmental, biophysical, and socio-economic factors.

New formulation of the public interest determination

Under the NEB Act, the Board had to consider various economic and market related factors in its review of pipeline applications, as well as any public interest it thought may be affected by the pipeline.[4] The CEAA 2012 built on this inquiry, but its version of the public interest assessment provided little additional guidance, focusing primarily on concerns related to the significant adverse effects that a designated project might have on the environment.

While the residual public interest consideration that applies to the Commission's review of pipeline applications under the CERA remains open-ended, the public interest inquiry under the IAA has been completely reformulated. For designated projects, the decision-maker will no longer have to simply determine whether any significant adverse effects identified in the environmental review can be justified in the circumstances. Under the CEAA 2012 and NEB Act, this was a discretionary decision that relied primarily on a weighing of the socio-economic and environmental benefits and burdens associated with a designated project. As the Board explained in its final major facilities report and recommendation:

> Weighing the public interest, as required by the NEB Act, is not a rigid or mechanical task. It is a complex, flexible, and multifaceted inquiry that requires the Board to conduct a thorough and scientific examination of evidence relating to economic, environmental, and social factors; to consider the impacts of [a proposed project] on Indigenous rights; to weigh and balance the overall benefits and burdens of [a proposed project]; and to draw conclusions. This consideration of benefits and burdens also informs the Board's recommendation under the CEAA 2012 regarding whether any significant adverse environmental effects can be justified in the circumstances. The various factors that the Board considers in [an] inquiry cannot be understood in isolation from one another, or divorced from the specific context and circumstances surrounding [a proposed project].[5]

Though the former Board appears to have adopted a holistic understanding of its duties, the IAA has pushed the scope of assessment and consideration even further, dropping the "significant" from "significant adverse effects" and requiring the appropriate decision-making authority to determine whether the adverse effects identified in the impact assessment and review are in the public interest with regard to the following considerations:

- the extent to which the designated project contributes to sustainability;

- the extent to which the identified adverse effects are significant;

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[4] *National Energy Board Act*, RSC 1985, c N-7, s 52(2)(e).

[5] National Energy Board, "Reconsideration Report: Application for the Trans Mountain Expansion Project" (MH-052-2018) (22 February 2019) at 3.

- whether the implementation of mitigation measures may alleviate any concerns arising from the adverse effects of the designated project;

- the impact that the designated project may have on any Indigenous group or their constitutional rights; and

- the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change.[6]

This list of factors appears to preclude the decision-maker from simply weighing the socio-economic and environmental benefits and burdens associated with a designated project. The public interest has now been defined as something different than a "net benefit" and it appears that Parliament is of the view that adverse effects, regardless of magnitude, are no longer justifiable if the project as a whole does not, in some manner, fit within these parameters, regardless of the net economic benefit. Complicating the analysis, however, is the fact that, while these factors are similar to those comprising the underlying impact assessment, the scope of the questions asked at the public interest stage of the inquiry does not extend to account for all of the considerations that informed the initial impact assessment. Until the IA Agency, a review panel, the federal government or a court provides further guidance, the manner in which the various assessments conducted under the CERA and IAA interact will introduce significant uncertainty into the project approval process.

The duty to consult and an increased emphasis on Indigenous interests

References to the Commission's and IA Agency's duties and responsibilities to the Indigenous peoples of Canada appear throughout the CERA and the IAA. While we have not put together an exhaustive list of these changes, the following are noteworthy:

- it is now explicitly within the mandate of the Commission and the IA Agency to perform its duties and functions in a manner that "respects the Government of Canada's commitments with respect to the rights of Indigenous peoples of Canada";[7]

- in discharging its duties, the Commission and the IA Agency must consider any adverse effects that a project, decision, order or recommendation may have on the Indigenous peoples of Canada;[8]

- the Commission must establish an advisory committee to improve the involvement of Indigenous peoples of Canada in energy infrastructure projects;[9] and

- when evaluating project applications, the rights, interests and knowledge of Indigenous peoples are now an enumerated consideration for the Commission and the IA Agency.[10]

Many of the principles underlying these express statutory requirements are already constitutionalized under s. 35 of the *Constitution Act*, 1982, and, as a result, already informed the NEB's and CEA Agency's administrative practices. Some of the specific requirements, however, are new.

Public participation

The NEB's previous test for standing, which limited participants to those that were either directly affected by a project or had relevant information or expertise, no longer applies. The language of both the CERA and the IAA disclose a broad and inclusive approach to public participation,[11] though it is only the CERA that expressly addresses standing. For pipeline applications, the CERA

[6] *IAA*, s 63(e).
[7] *CERA*, s 11(h).
[8] *Ibid*, s 56.
[9] *Ibid*, s 57.
[10] *Ibid*, ss 183(2)(d) and (e), 262(2)(d) and (e), 298(3)(d) and (e); *IAA* ss 22(1)(g) and (l).
[11] *CERA*, s 183(3); *IAA*, s 11, 27, 99.

contemplates an open-ended public right of participation: "Any member of the public may, in a manner specified by the Commission, make representations with respect to an application for a certificate."[12]

This change has the potential to cause significant delays to the review process; however, it may be that the Commission or review panel simply adopts a procedure similar to that previously employed by the NEB: permitting those whose interests are directly affected to directly intervene while limiting the participation of less directly affected parties to letters of comment.

Timelines for review and the "planning phase"

During the debate surrounding Bill C-69's development, the federal government frequently stated that an objective of the proposed legislative changes was to improve decision certainty and turnaround times.[13] One mechanism that may help achieve this goal relates to designated projects under the IAA. Prior to the commencement of an impact assessment, the proponent of a designated project must conduct a planning phase in which it engages with the public and works with the IA Agency and relevant federal authorities to determine what the eventual impact assessment will consider and what information the IA Agency or review panel will require to conduct its assessment. This planning phase is set to take no more than 180 days, but may be extended.[14]

Once a review or assessment has commenced under either the CERA or IAA, there are limits on the amount of time the relevant regulatory authority will have to issue its report and recommendation to the Governor-in-Council (the **GIC**). There are similar time limits that apply to decisions that must be made by the GIC.

Consistent with the NEB Act, proponents of pipelines shorter than 40 km may apply for an exemption from the full review and certification process.[15]

Applications for pipelines that are shorter than 40 km or require less than 75 km of new right of way will also, at least procedurally, look similar to the process previously conducted under the NEB Act. Applicants will apply to the Commission, the Commission will issue a report and recommendation to the GIC within 450 days following the receipt of a complete application,[16] and the GIC will make a final decision within 90 days of receiving the report.[17]

New interprovincial or international pipeline projects that require 75 km or more of new right of way, however, are designated projects and will be assessed by a review panel. A review panel operating under the CERA and the IAA must issue its report within 300 days of the commencement of the impact assessment and project review, though this time limit may be set for as long as 600 days if the IA Agency believes that more time is required.[18] Once it has received a report prepared by the review panel, the GIC must consider the report and issue a decision within 90 days.[19]

For all other designated projects, the IA Agency (or, if necessary, a review panel) must complete its impact assessment within 300 days,[20] at which point the Minister must either issue a decision within 30 days or refer the matter to the GIC for further consideration.[21] As above, however, the initial 300 day limit may be extended to be as long 600 days if the impact assessment is conducted by a review panel.[22]

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[12] *CERA*, s 183(3).

[13] Canada, Government of Canada, *The Canadian Energy Regulator Handbook*, (Ottawa: Environmental and Regulatory Reviews, 4 February 2019), online : <https://www.canada.ca/content/dam/themes/environment/conservation/environmental-reviews/neb-handbook-e.pdf>.

[14] *IAA*, ss 18(1) and (3).

[15] *CERA*, s 214(1)(a).

[16] *Ibid*, s 183(4).

[17] *Ibid*, s 186(3).

[18] *Ibid*, ss 185(c), 263(c); IAA, s 37.1(2).

[19] *Ibid*, ss 186(3), 262(9).

[20] *IAA*, s 28(2).

[21] *Ibid*, s 65(3).

[22] *Ibid*, s 65(4).

Despite the assurances of the federal government, it is not obvious that the changes and timelines implemented under the new regime will actually improve decision certainty and turnaround times. Indeed, given the addition of new factors for consideration, increased opportunity for public participation, and the discretion of the Minister to extend or suspend the specified timelines, project reviews may, in fact, take longer.

For pipelines, the GIC can no longer disregard a negative recommendation

Under the CERA, the GIC no longer has the ability to exercise its discretion and approve a pipeline if the Commission (or review panel) recommends that it not approve the project.[23] If the recommendation contained in the report is that a project not proceed, the GIC may only reject the application or ask that the recommendation be reconsidered.

FLEXING ITS REGULATORY MUSCLE: A PRELIMINARY ASSESSMENT OF THE CER'S FIRST TWO DECISIONS

As mentioned above, most of the media and public commentary concerning BillC-69 focused on the changes that Parliament made to the facilities application process. However, the CERA also gave the CER jurisdiction over the economic regulation of pipelines. While many of the new provisions related to economic regulation appear similar to those the NEB administered under the NEBA, the CER is a new regulatory body and it may discharge its regulatory functions differently. Although it is too early to tell just how differently (or similarly) the CER will regulate the economic operation of pipelines, its first two decisions dealing with these matters hint at a regulator that will: (i) respond quickly when needed; and (ii) seek to maintain some semblance of regulatory continuity.

Within its first month of taking over from the NEB, the CER was asked to consider and determine two important applications concerning the economic regulation of the NOVA Gas Transmission Ltd. pipeline system (the **NGTL System**) and Enbridge's Canadian Mainline Pipeline System (the **Mainline**). In both cases, the CER acted promptly, convening hearings and issuing decisions within a matter of weeks. In establishing the hearing processes for the two applications, the CER appears to have had regard to the nature of the applications and timelines in which it would need to issue its decisions. The Enbridge hearing consisted of written submissions and opportunities for written reply; the NGTL hearing relied on a hybrid approach, accepting written letters of comment and oral submissions. In the latter case, the Commission demonstrated that it can, when necessary, act quickly: in response to NGTL's application, the Commission issued a hearing notice on Friday, September 20, held the oral hearing on Wednesday, September 25, and issued its decision (with reasons to follow) the next day.

Tariffs

On August 26, 2019 — two days before the official regulator changeover — NOVA Gas Transmission Ltd. (**NGTL**) filed an application with the NEB under s. 60(1)(b) of the NEB Act, seeking an expeditious amendment of the NGTL tariff (the **Tariff**) to incorporate a temporary service protocol (the **Protocol**) that would, for limited periods of planned maintenance and expansion-related outages commencing October 2019 and applying primarily throughout the summer months, allow NGTL to prioritize delivery and storage service, whether firm or interruptible, over upstream receipt service in areas subject to system constraints.[24]

The system constraints that NGTL sought to resolve with the Protocol are complex. But to summarize: in August 2017, NGTL implemented a new service protocol that prioritized firm receipt and delivery service over all interruptible service types, including storage. Because NGTL System regulation applies System-wide, this limited the ability of shippers on the NGTL System to flow gas into storage (which always operates on an interruptible basis) or to other downstream markets.

The inability of shippers to access storage due to the curtailment of interruptible services was identified as one of the primary factors

[23] *CERA*, s 186(1)(b).

[24] Canadian Energy Regulator, File OF-Tolls-Group1-N081-2019-04 01; Hearing Order RH-002-2019.

driving the price volatility that has severely impacted western Canadian gas markets. Due to its potential economic implications, the proposed temporary service Protocol enjoyed widespread support among producers that relied on the NGTL System to get their gas to market. Interestingly, the Government of Alberta was deeply involved in developing and advocating for the Protocol, including by consulting with NGTL prior to its application to the NEB and, ultimately, participating as an intervenor and providing oral argument in favour of the amendment.

As mentioned, the Commission issued a letter decision with reasons to follow the day after the hearing took place, approving the application as filed and permitting NGTL to amend the Tariff and implement the Protocol.

Tolls

On August 2, 2019, following extensive discussions with oil producers in western Canada, Enbridge Pipelines Inc. (**Enbridge**) announced the commencement of an open season for transportation on the Mainline (the **Open Season**). In announcing the Open Season, Enbridge also announced that upon the expiry of the current NEB-approved Competitive Tolling Settlement, it would transition the Mainline from a common carrier that operated entirely on an uncommitted basis, shifting the allocation of capacity on the Mainline such that 90 per cent was reserved for shippers with long-term commitments with 10 per cent of capacity for spot service.

The Open Season was scheduled to end on October 2. Given Enbridge's control over more than 70 per cent of oil transportation capacity out of the Western Canadian Sedimentary Basin, had the Open Season gone ahead as planned, it would have dramatically altered the western Canadian oil market.

Suncor Energy Inc. (**Suncor**) responded to Enbridge's Open Season proposal with a complaint to the NEB (the **Complaint**), asserting that the terms of Enbridge's planned Open Season and the related transition from a common carrier to contract carrier pipeline: (i) violated the rules of open access the Board historically enforced; (ii) represented an abuse of a dominant market position; and (iii) would result in service terms and tolls that are unfair, unjust, unreasonable, and unjustly discriminatory. Three other parties — Shell Canada Limited (**Shell**), the Explorers and Producers Association of Canada (**EPAC**), and Canadian Natural Resources Limited (**CNRL**) — submitted letters that largely aligned with the issues that Suncor identified and positions it adopted in the Complaint. All of the issues raised in the Complaint would have been valid under the new CERA; however, due to the transitional provisions in Bill C-69,[25] the Complaint was heard by a Commission of the CER under the provisions of the old NEB Act.

Responding to the Complaint and the submissions from Shell, EPAC, and CNRL, the NEB initiated a written comment period — carriage of which was promptly taken over by the Commission — drawing participation from approximately 30 interested parties. Following response submissions from Enbridge and each of Suncor, Shell, EPAC, and CNRL, the Commission halted the Open Season.

The Commission's reasons were set out in a brief letter decision issued two weeks after the hearing process concluded. While the decision itself does not deal with tolling matters in sufficient depth to indicate whether the CER will discharge its economic regulation of pipelines in a manner similar to or different from the NEB, the Commission did emphasize the importance of regulatory continuity — at least in respect of issues such as tolls and tariffs — expressing a desire to be consistent with past Board precedent:

> In coming to its decision on this matter, the Commission has been guided by the established regulatory framework, including past decisions of its predecessor, the NEB, regarding toll and tariff regulation. The NEB's past decisions consistently underlined the importance of fairness and transparency in open season processes. The NEB has also stated that market power must not be allowed to be abused, both in terms of substance and appearance or perception. An

[25] *Supra* note 1, s 36.

> apprehension that some market players are abusing their power may lead to inefficient outcomes, and needs to be addressed.[26]

Despite this intention to conform to past Board practice, the CER's intervention with an industry-driven open season is a highly unusual step. However, the Commission's decision is not entirely surprising. Indeed, Enbridge's plan to transition the service model on the Mainline from common to contract carrier was unprecedented and, because no new capacity was offered, would significantly reduce industry's ability to access uncommitted oil transportation capacity. In light of this, the Commission justified its departure from past Board practice by pointing to two overriding concerns: (i) the fairness of the Open Season process that Enbridge initiated; and (ii) "the perception of abuse" resulting from Enbridge's dominant market position in a monopolized and capacity constrained industry.[27] Despite halting the Open Season, the Commission directed Enbridge to develop and return with a full application if it decided to proceed with an open season and service change.

Same regulator, different name?

What do these two decisions tell us? On their merits, they suggest that the Commission is concerned with the maintenance of regulatory continuity; however, it is important to remember that the provisions related to the economic regulation of pipelines in the CERA are essentially identical to those that were in the NEB Act. It should come as no surprise, then, that the Commission remained committed to the same principles that the NEB developed, even if it did expand their scope of application. On a more qualitative level, however, the speed with which the Commission commenced and completed its hearing processes demonstrates that it is mindful of the need for a responsive regulator to oversee the challenging dynamics of the Canadian energy industry.

CONCLUSION

As with any new legislative and regulatory paradigm, there will be growing pains. The changes brought about by Bill C-69 have broadened the scope of considerations the Commission and IA Agency must now review in assessing new projects, many of which are themselves amorphous and difficult to define. What is clear, however, is that the burden for new pipeline project proponents appears to be greater now than it was under the old regime. That said, with its first two decisions, the Commission has shown itself attuned to the needs of industry and the often complex market dynamics that shape the Canadian oil and gas sector. While we wait to see how the CERA and the IAA will shape regulatory processes moving forward, Alberta has challenged the constitutionality of Bill C-69, arguing that it improperly interferes with its jurisdiction to manage the development of its natural resources. In addition, the outcome of the 2019 federal election may result in further changes to the regulatory process. ■

[26] Canada Energy Regulator, "Letter Decision re Enbridge Mainline Open Season" (C01893-1) (27 September 2019) at 2 [internal citations omitted] [the **Mainline Letter Decision**], citing: NEB, RH-001-2012 Reasons for Decision; NEB, OH-01-2011 Reasons for Decision; NEB, OH-1-2009 Reasons for Decision; NEB, GH-001-2018 Letter Decision; NEB, OH-2-97 Reasons for Decision; NEB, RH-3-2004 Reasons for Decision.

[27] *Ibid*, at 2.

AN INTERVIEW WITH THE CHAIR OF RÉGIE DE L'ÉNERGIE*

Jocelin Dumas

STANDARD QUESTIONS

1. Tell us about the organization you lead, its current structure/composition, size, key initiatives and range of work?

The Régie de l'énergie is an economic regulatory administrative tribunal mandated since 1997 to regulate and oversee Quebec's energy sector. Its chief role is to oversee energy distributors' operations to ensure there is enough supply to meet the needs of Quebec consumers. It also reviews complaints and sets rates and terms of service for electricity, steam, and natural gas consumers. *Note: Quebec's electricity generation is not regulated.*

The Régie also intervenes for transmission line routes when disputes arise between a municipality and Hydro-Québec.

The Régie has other energy-related mandates (monitoring the price of oil products, enacting and overseeing reliability standards for power transmission in Quebec, etc.). It has recently received more mandates (reviewing oil and gas production and storage projects, issuing opinions on whether Transition énergétique Québec's Master Plan can meet government energy targets, etc.).

The Régie has 82 employees and 10 commissioners at its Montreal office. A hearing room is also available in Quebec City as needed. The Régie has six divisions (Chairman's Office; Committee of Commissioners; Budget, Administration and Personnel Directorate; Legal Services; Secretariat; Planning and Regulation Directorate). The Planning and Regulation Directorate has the most staff and includes economic regulation specialists.

For regulatory issues, the Régie works in project management mode by bringing together specialists and lawyers with expertise in the matter at hand. These teams of professionals advise managers and help them process cases.

In the last two years, the Régie has been especially busy with historic high numbers of applications and had to rule on new issues stemming from advances in technology. In April it made an initial decision on Hydro-Québec's proposal to create a new class of customer for cryptographic use applied to blockchains, to create an energy block for this purpose, and to set its own rates and terms of service.

It spring 2019, it also held a hearing on the project to deploy fast-charging infrastructure, a key Quebec government initiative to promote electric vehicle sales. The project will roll out nearly 1,600 DC fast-charging stations over a 10-year period.

In recent years the Régie has favoured approaches to cut regulatory and administrative red tape. On the regulatory side, it opened a file to ensure incentive regulation mechanisms were created for Hydro-Québec transmission and distribution activities. These mechanisms are now in place and should help streamline the regulatory process for setting hydro rates vs. the cost-of-service regulation model. In the natural gas sector, the Régie allowed Gazifère to apply to set rates on a two-yearly basis to help streamline the regulatory process for applicants. For the full review of Hydro-Québec Distribution's terms of service, the Régie allowed work sessions to be held at the start of the process and required stakeholders to submit proposals at the end of the session. After the work sessions,

* This interview was conducted in French and has been translated for the purpose of the *Energy Regulation Quarterly.*

Hydro-Québec changed its evidence to reflect stakeholder recommendations. This process has done a great deal to streamline the way matters are addressed.

On the administrative side, the Régie proposed a draft regulation (now in force) to raise the thresholds above which capital projects by regulated firms must be submitted to the Régie for approval — thus reducing the number of cases to process. Last fall it also launched a pilot project to start shifting toward a paperless Tribunal to cut related costs and process cases more efficiently. Given the positive feedback from interveners, the Régie will extend this approach to every case it processes.

2. Though similar in their roles the many energy regulatory boards and tribunals across Canada have particular mandates and responsibilities. What do you see as the unique elements of your Organization/ Board/Tribunal's mission/legislative mandate and circumstances?

Compared to other provinces, the Régie's mandate for electricity rates is unique in that the province's only major power distributor, Hydro-Québec, is a monopoly whose sole shareholder is the Government of Quebec. In this context, the need for an arm's-length organization free from political influence is all the more important. Creating an independent regulator like the Régie also addresses the FERC's request for reciprocity to allow free access to North American electricity markets.

If passed, Bill 34, tabled in the National Assembly last June by the Government of Quebec, will make major changes to the way electricity rates are set. The bill provides that as of April 1, 2020, electricity rates will be set at 2019 levels and then indexed to inflation for the next four years. The Régie would then have to set rates every five years whereas current practice is to conduct an annual review. Hydro-Québec would also no longer need Régie approval for business plans or capital investment. The Régie would have the same responsibilities for determining transmission rates and electricity distribution terms of service. It would also retain authority to change existing rates or set new ones at any time at the request of Hydro-Québec Distribution, where circumstances warrant it and where the government has issued an Order-in-Council stating its concerns thereto.

The Régie is also characterized by unique mandates not commonly assigned to regulators in other Canadian jurisdictions (reviewing projects to issue oil and gas production and storage licences, etc.). Exploration licensees who wish to obtain an oil and gas production or storage licence must submit their project for review to the Régie and get a favourable ruling. To get a favourable ruling, they must also apply to the Régie to build and use pipelines.

The role of petroleum monitoring is unique. The Régie publishes a wide range of data for retailers and consumers. For instance, a daily report on gasoline prices and purchasing costs helps the public find out where to buy gas at the best price. It also handles requests for government input on the cost of oil and gas products.

Régie decisions are final and without appeal, unlike those of most Canadian regulators whose rulings can be appealed to a province's Supreme Court or to the Court of Appeal. This means anyone wishing to overturn a Régie decision must do so through judicial review — an onerous task, since the reasonableness standard is applied to Régie decisions due to its status as an expert tribunal.

Lastly, the use of French is the most obvious distinguishing factor. The Régie conducts all business in French, which is important for power grid reliability standards since in North America all such communication and documents are in English.

3. Economic regulation of energy is at the centre of various public policy considerations (economic, environment, social, political). Where do you see the biggest regulatory and legislative challenges for your organization over the coming decade?

With growing global awareness of the impact of greenhouse gas (GHG) emissions, the next decade's biggest challenge will be energy transition — a profound and unavoidable upheaval that affects us all. Standard economic regulation principles work well in a stable environment. Traditional economic regulation is good for centralized energy production with a long cost-recovery period. However, changing transforming energy markets and new technology (access to means of self-production, etc.) have created new issues that challenge traditional principles. Amid rapid structural

change, economic regulators must adapt their analytical tools and the way they use them.

Growing demand for renewable natural gas is an example of change resulting from concern over GHG emissions. How do we define and regulate the role of renewable natural gas (RNG)? To increase the proportion of renewable energy the Quebec government passed the *Regulation respecting the quantity of renewable natural gas to be delivered by a distributor,* which states that at least 1 per cent of distributed natural gas must be from renewable sources. The proportion will increase to 5 per cent in 2025.

Energy transition will create complex problems involving multiple parties and stakeholders. To achieve collectively agreed goals, more dialogue between regulators, governments, and stakeholders may be needed.

QUESTIONS ON RECENT TRENDS

1. Focusing on environmental considerations, and specifically Greenhouse Gas Emissions, can you expand on how these factors are integrated into your regulatory approach and/or processes?

The *Act respecting the Régie de l'énergie* states that in the exercise of its functions, the Régie shall promote the satisfaction of energy needs *"in a manner consistent with the Government's energy policy objectives and in keeping with the principles of sustainable development and individual and collective equity."* The Régie therefore considers the GHG reduction targets set out in the government's 2030 Energy Policy. In regulatory matters, the Act also requires that the Régie consider *"such economic, social and environmental concerns as have been identified by order by the Government."*

The Régie's case flow process also considers these things. Anyone interested in a case may apply for intervener status and weigh in on environmental issues. Environmental groups regularly appear before the Régie to advocate on the environmental impacts of various cases (GHG emissions, etc.). The Régie also has in-house economic and energy specialists to assist commissioners in their decisions.

2. We see movement by various economic regulatory bodies, aimed at modernizing regulatory tests/formulas and remuneration models. (One such move has been to equalize the treatment of capex and Opex in terms of investments in cloud services.) What are your views on existing economic regulation as it pertains to new and emerging technologies, innovation, and investment models?

To ensure sound and relevant analyses, a regulatory body's key duties are to integrate best practices into its operations, keep informed of the latest developments, and ensure staff are proficient in them.

Competence is the top value set out in the Régie's 2017-2020 strategic plan and will no doubt continue to be. Under the current plan, various actions will continue to track the latest trends and whether the resulting knowledge is shared. Knowledge transfer and ongoing training are also among the plan's priority activities.

The Régie also wants to take the initiative and hold discussions, with interveners in its proceedings, on the analytical models used. For instance, it has begun exploring how to include non-economic benefits in cost-benefit analyses used to determine the cost-effectiveness and relevance of energy efficiency programs or capital projects. The process is in the early stages of preparing a case and we may hold a forum to discuss the issue.

3. Is there an opportunity for utilities, now and in the future, to work collaboratively to respond to market needs/demands (e.g., natural gas utility partnering with electric system operators on power to gas to balance renewable electricity using the gas grid as storage)?

This is an interesting question for the heads of firms that have begun exploring ways to work together in their public interventions. Energy transition may create more such opportunities (provided, of course, that projects reflect market needs and demands).

Experts will likely say power-to-gas (P2G) conversion is more suitable for certain situations (powering remote sites like mining projects, etc.). Diesel is often preferred far outside urban centres but is expensive and hard to transport. A P2G-based system may have

benefits where locally-produced solar and wind energy is used.

For the approach to be worthwhile, there must be an extensive gas distribution system to convert energy on site and deliver it where it is needed. Quebec has just one major power distributor and the province's natural gas firms serve a different clientele than those in the rest of Canada. Most electricity consumed by Quebecers comes from a renewable resource — hydroelectricity. The gas network's scope is also more limited. In this context there is likely no room for a large-scale P2G rollout, except perhaps as a backup solution in special circumstances.

That said, for the Régie there is no apparent regulatory barrier to cooperation. The firms in question may apply to it for approval of a business plan, a joint capital project, or a rate or fee for such a joint undertaking.

4. Ratepayers bear the cost of regulation. What controls do you use to ensure the ratepayer is receiving value commensurate with the costs incurred? Do you use any performance metrics or otherwise participate in any processes (e.g. benchmarking) to evaluate regulator performance?

To gauge its performance, the Régie keeps regular track of the number of cases processed, decisions made, and time taken to process each case. These data are published in its annual report, so the public can see them. However, it has set no specific targets except to meet the legal requirement that its decisions be made with diligence — which may vary greatly depending on a case's nature and complexity. Its preferred approach of open and ongoing dialogue with interveners helps obtain regular feedback on the effectiveness of its processes, among other things.

The Régie holds an annual meeting where most interveners can speak directly with the Chairman. A Bar of Montreal/Régie de l'énergie Liaison Committee, which includes interveners in our proceedings, also helps continuously improve our regulatory procedures and practices. Given the unique traits of the Quebec market where a limited number of people and firms fall under Régie authority, it is fairly easy to stay in contact with them and get input to improve the way we process cases.

To assess the Régie's added value for consumers, we could compare Hydro-Québec's requested annual rate increase to the one set by the Régie after a review of the case. For instance, in the last four years, a review of the Régie and its stakeholders led to a required revenue cut of just under $200 million on average or a cut of about 2 per cent a year for consumers. On average, for every $1 of Régie operating costs there is a rate reduction of about $110. These estimates clearly show that consumers get value for their money. ■

GRETCHEN BAKKE'S MEDITATION ON THE GRID[1]

*Ahmad Faruqui**

The public only pays attention to the grid when the power goes out or when a new transmission line threatens to run too close to their house or to obscure the visibility of a landmark. The public expects that when they flip the switch, the bulb will light up, regardless of the time of day.

The challenges facing the grid have long been analyzed and discussed by engineers and economists and policy wonks of all stripes. But these discussions in scholarly and trade journals are often couched in technical language and arcane jargon that makes them inaccessible to the public.

Gretchen Bakke, who teaches cultural anthropology at McGill University in Montreal, and is currently a guest professor at Humboldt University in Berlin, has sought to resolve this gap in knowledge by appropriately meditating on the grid. A native of Portland, Oregon, she obtained a bachelor's degree in Russian and Soviet Studies and Photography from Evergreen State College in Olympia, Washington and a master's degree in Russian and East European Studies from Indiana University before obtaining a doctorate from the University of Chicago. Her dissertation was on Contemporary Slovene Art and Artifice.[2] This background guarantees that we will get a fresh perspective on the subject. Unsurprisingly, the book has favourably garnered the attention of the Wall Street Journal[3] and Canada's National Post[4] and the author has appeared on NPR.[5]

Bakke gives the "grid" the broadest meaning which encompasses not just the transmission and distribution systems with which the term is commonly associated but also the power plants which generate the electricity.[6] Appropriately, she avers that the grid is "a complex and expansive electrical delivery system that we care little for and think even less about."[7]

The book covers the evolution of the industry from Edison's Pearl Street station in Manhattan (and indeed there is also some early discussion of the years that preceded it including an assertion that the grid first manifested itself in 1879 in San Francisco) to Samuel Insull's Chicago Edison (today's Commonwealth Edison). She shows that in the beginning of

* The author is an economist and a principal with The Brattle Group based in San Francisco. The views in this essay are his own and not those of Brattle. He would like to acknowledge the assistance of Phil Hanser and Cody Warner in writing this review. Comments can be directed to ahmad.faruqui@brattle.com.

[1] Gretchen Bakke, *The Grid: The Fraying Wires Between Americans and Our Energy Future,* (United States of America: Bloomsbury, 2016).

[2] Gretchen Bakke, "Formation", posted on Gretchen Bakke's profile, online: LinkedIn <https://www.linkedin.com/in/gretchen-bakke-485067135>.

[3] R. Tyler Priest, "The Marvel of Electricity", *The Wall Street Journal* (15 july 2016), online: <http://www.wsj.com/articles/the-marvel-of-electricity-1468616241>.

[4] Gretchen Bakke Ph.D, "The Grid: The Fraying Wires Between Americans and Our Energy Future", *National Post* (last updated 29 July 2016), online: <http://news.nationalpost.com/arts/books/book-reviews/gretchen-bakkes-the-grid-illustrates-the-right-way-to-fix-whats-wrong-with-the-future-of-energy>.

[5] Dave Davis, "Aging And Unstable, The Nation's Electrical Grid is 'The Weakest Link'", *National Public Radio* (22 August 2016), online: <http://www.npr.org/2016/08/22/490932307/aging-and-unstable-the-nations-electrical-grid-is-the-weakest-link>.

[6] *The Grid, supra* note 1 at xiii.

[7] *Ibid*, at xii.

the electric industry, there were several hundred isolated grids which eventually interconnected and became the three regional grids that cross the country.

She discusses in some detail the large power outages that have occurred in 1965, 1977, 1987, 1994 and 2003 and the economic harm they caused the nation. And then she goes on to say that the current move toward more sustainable energy solutions will require "a serious reimagination of the grid. The more we invest in 'green' energy, the more fragile our grid becomes."[8]

Along the way, she guides the reader through the physics and engineering of how electricity flows from the power plant to the end user's appliances, buildings and industrial processes. These discussions, written in plain English and supplemented with simple diagrams and illustrations explain, for example, the difference between series circuits and parallel circuits. The style is conversational, not turgid. And, unlike many other popular works on the subject, she does not confuse electricity with electrons but with the movement of electrons: "This flow of electrons is still doing work every time it passes through a machine."[9]

Bakke makes some very valid points. The grid is aging and in significant need of an upgrade in the face of new technologies which customers and producers now want to attach to it. She says that "the grid is worn down, it's patched up, and every hoped-for improvement is expensive and bureaucratically bemired."[10] Massoud Amin, a professor of electrical engineering at the University of Minnesota, who has also worked at the Electric Power Research Institute (EPRI), is quoted for good measure for supporting her views.

The grid was designed to move electricity from the power plant to the customer and not designed to do the reverse, that is, move electricity from one customer to another via the grid, a phenomena arising from the emergence of customer-owned generation, so-called distributed energy resources (DER), such as rooftop solar photovoltaic panels. Many customers are becoming increasingly organic and green in their tastes. This means that they are becoming more energy efficient and likely to consume less electricity. This creates a revenue shortfall for the utility which it must recover by raising rates, creating the scenario which is commonly called the "utility death spiral."

The book recognizes the challenges created by the need to integrate renewable energy into the grid, arising largely from the intermittent character of these resources, but also from the grid's need to provide to power whenever demanded of it. It also recognizes the issues created by net energy metering in the presence of volumetric rates since it causes "the bills of…customers without solar to rise precipitously."[11] Bakke adds later in the book, "American utility companies cannot maintain the transmission and distribution systems on our grid by charging solely for how much electricity they individually consume."[12]

Elsewhere, she acknowledges the challenges posed by a slow regulatory process: "And though many [utilities] are now scrambling to find new ways of generating revenue, they are hamstrung at every moment by a regulatory structure that impedes quick changes and trial balloons."[13] But that slow pace of change is a result of the regulator's approach to meeting their responsibility to the public. Their cautiousness is founded in the view that changes to the grid's rules will undoubtedly have long-term effects and could be expensive.

While all this is well known to industry experts, there is a lot to be said for getting these ideas and issues across to the public at large, from which new regulatory commissioners and analysts are drawn, as well as current and future legislators, governors and presidents.

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[8] *Ibid*, at xvi.

[9] *Ibid*, at 49.

[10] *Ibid*, at xiv.

[11] *Ibid*, at xxi.

[12] *Ibid*, at 235. I.e., that today's rate designs will have to yield to more sophisticated, three-part rates which charge for capacity through kW charges and for energy through kWh charges.

[13] *Ibid*, at 234.

Clearly, much effort went into the writing of the book. Of its 352 pages, 47 pages are devoted to documenting her claims in end-notes.[14]

However, for a book aimed at educating the public about the grid, the tone of the book seems overly strident at times. Bakke frequently attacks electric utilities as obsolete institutions and constantly asserts her seemingly strongly-held belief that utilities will not be able to save themselves. She also asserts that people are so upset with the erratic functioning of the grid that they want to make the power themselves and asserts that grid defection is increasingly likely. She does not realize that the vast proportion of reliability issues are a result of the grid's weakest link – the distribution system, not the much more massively sized transmission system and generation components. Indeed, the concern of the regional transmission systems' operators is how much additional risk for outages will be created by the large scale deployment of intermittent resources. She says she has spoken to people who have "consistently reiterated the view that electricity was a basic human right. It was something the government should ensure all people had access to just like potable water or breathable air." And then comes the most telling sentence in the book: "This is also my view."[15] This seems to be the raison d'etre for writing the book.

Bakke says that over the past century, "The utilities managed the grid, they made the power, they owned the wires, they distributed electricity, and they collected the money."[16] Fair enough. But then she goes on to say, referring to PURPA which was passed in 1978, "The law prevented other electricity makers (by dint of not providing a license) from building their own distribution networks and entering into competition with the existing utility." Well, to this day no one has been able to make a case for multiple distribution networks. That function remains a natural monopoly[17].

In her eyes, the utilities are trapped in an existential dilemma. "The utilities don't know how to upgrade existing technology without putting themselves out of business. Nor do they know how to continue with the existing infrastructure without going out of business."[18] And furthermore: "The utilities' panic is real; it's not aesthetic, not even greedy, and not particularly malicious. As improbable as it might seem, it's real structural, organizational panic."[19] This is too alarmist. No doubt the entire industry is in the process of redefining itself driven by the new technologies which hope to advantage themselves through use of the grid – not just large scale wind and rooftop solar photovoltaic, but also electric vehicles and new storage technologies. Yet to be understood, and that could also have profound impacts on the grid, is the impact of long-term supplies of cheap natural gas.

There is an extensive discussion on what went wrong with Xcel Energy's SmartGridCity in Boulder, Colorado.[20] Yes, that project ran into insurmountable problems for all kinds of reasons and was shut down. But the problem was not the workings of smart meters, smart appliances, smart thermostats or dynamic pricing. All of those have worked well in other pilots. No one requires customers to do their laundry at 2 a.m. and their vacuuming at midnight.[21] Bakke's reference to these commonly-held fears simply perpetuates the self-fulfilling prophecy that dynamic pricing is impossible to deal with. She cites a Boulder resident as saying: "To many consumers the Smart Grid means that some bureaucrat will turn off their air conditioner when it is very

[14] The surprising omission is the lack of any references to the extensive reports published on various facets of the grid by EPRI.

[15] *The Grid, supra* note 1 at 46.

[16] *Ibid*, at 94.

[17] Indeed, there have been places where parallel distribution lines ran down streets and for which different companies sold power from each of them. Eventually, only one company remained in business. This is similar to the experience of New York's original subway systems, where parallel tracks in Manhattan owned by different companies eventually went bankrupt.

[18] *The Grid, supra* note 1 at 173.

[19] *Ibid*, at 174.

[20] *Ibid*, at 159-174.

[21] *Ibid*, at 164.

hot outside." As far as I know, no one has turned off anyone's air conditioner without their consent, unless a power outage occurs. Customers are incentivized to adjust their thermostat settings by a couple of degrees and it is entirely up to them whether they do so or not. Oklahoma Gas & Electric is running a very successful program where dynamic pricing is coupled with smart thermostats and has signed up a fifth of its customers on the program. Furthermore, Arizona Public Service has signed up half of its customers on a time-of-use rate program without providing them any enabling technology.

Smart meters are also a focus of her animus since, in her view, utilities are installing them to take "control over home air-conditioning, and why they prefer we all vacuum at midnight."[22] That Orwellian view simply does not comport with reality. No utility that is deploying smart meters is on such a mission. What largely motivates utilities to install smart meters is fourfold: 1) improving response times for customer outages by knowing who has lost service (without smart meters that is largely reasonable inference and guesswork); 2) reducing costs for meter reading and other meter services; 3) providing energy management tools to customers such as web portals that display hourly load profiles so that they can make smart decisions on how to manage their bills and 4) providing customers with rates that actually reflect the costs the utilities incur to serve them. Economists for years have urged for the implementation of cost reflective-rates on the bases of both providing customers' prices that allow them to make the right energy consumption and investment decisions, but also as a means of mitigating the market power of generators. Unfortunately, while 40 per cent of the meters are smart today, and some 5-10 million are being installed annually, less than 2 per cent of the customers are on a smart rate. When it comes to smart pricing, the train has not left the station.

After discussing several load control programs, some involving residential and some involving commercial and industrial customers, Bakke asserts: "In almost every case, the smart meter is what makes this voluntary ceding of control over household energy use to the utility possible. It is their primary weapon in softening peaks. And it's begun to work."[23] This is entirely false. She has confused smart-meter enabled smart rates with traditional direct load control programs and load curtailment programs which go back a half-century. None of them require smart meters or the smart grid.

She offers an erroneous discussion of the Bakersfield problem in which some households alleged that their bills had doubled after the installation of smart meters. A state senator seized upon this claim to breathe life into his gubernatorial ambitions through town hall meetings. It was totally repudiated and conclusively rejected by a study carried out the California Public Utilities Commission. She says that some customers were surprised to find that their electricity usage actually increased during a six-hour blackout while others found that they were paying more for electricity than for their rent. "And though there has been a lot of quibbling as to why, nobody argues with the fact that with the new technology's arrival, monthly electric bills doubled, or at times trebled."[24] She seems to suggest that PG&E offered multiple explanations, one of which was the presence of time-of-use rates. That could not possibly be the case since those customers were not on such rates at that time. Then she goes on to perpetuate another myth, that smart meters impinge negatively on people's health through electromagnetic radiation, which has been investigated and shown to have no health impacts.

The book is marred by several elementary mistakes. For example, the assertion that coal power plants can be used as cycling units,[25] that Southern California Edison has 14 million (and not 5 million) customers,[26] that wireless distribution is feasible,[27] that demand-side

[22] *Ibid*, at 178.

[23] *Ibid*, at 180.

[24] *Ibid*, at 155-56.

[25] *Ibid*, at 178.

[26] *Ibid*, at 78. This is surprising since some of the research was done in the Huntington Library and by consulting the papers of Southern California Edison in particular.

[27] *Ibid*, at 282.

management is a new phenomenon enabled by smart meters (it goes back to the early 1980's),[28] that there was an oil embargo in 1978 (there was oil price spike in 1979),[29] and that the California energy crisis of 2000-01 caused the near bankruptcy of its two largest utilities (only one went bankrupt).[30]

Unfortunately, a book which had begun on a promising note, takes its reader on a journey that abounds in sweeping generalizations, unsupported statements, conjecture and speculation. The narrative is marred by invective: "[B]y the 1970s the utilities had ceased to live and function in the real world. …Their power had grown absolute, plodding, and blind… [T]he most risk averse and least facile minds were running the game."[31] These statements bring into question the objectivity of the author. By the time I was done reading the book, the grid had become the grind. ■

[28] *Ibid*, at 152.

[29] *Ibid*, at 90. There was a second oil price shock in 1979.

[30] *Ibid*, at 113. One did indeed go bankrupt and the other went nearly bankrupt.

[31] *Ibid*, at 92-93.

BREAKDOWN: THE PIPELINE DEBATE AND THE THREAT TO CANADA'S FUTURE, DENNIS MCCONAGHY, DUNDURN TORONTO, 2019

Rowland J. Harrison, Q.C.

B*REAKDOWN: The Pipeline Debate and the Threat to Canada's Future* is Dennis McConaghy's sequel to his 2017 *DYSFUNCTION: Canada after Keystone XL,* which chronicled the saga of the Keystone XL project and its ultimate rejection in November 2015 by President Barack Obama.[1] *BREAKDOWN* essentially picks up where *DYSFUNCTION* left off, detailing events that occurred primarily within Canada from late 2015 to the end of 2018, a period of intense regulatory, political, legal and other developments related to proposals to expand export market access for Canada's vast oil and natural gas resources.[2]

McConaghy knows his subject. With nearly 40 years of industry experience in infrastructure development, he was the lead TransCanada Pipelines executive for the Keystone KXL Project. Since his retirement from TransCanada in 2014, he has continued to follow developments closely, in the belief that Canada faces fundamental, existential questions:

> Should the country commit itself to hydrocarbon development as an indispensable contribution to its economy? Or should Canada eschew that opportunity as incompatible with contributing reasonably to containing the risk of global climate change?[3]
>
> * * *
>
> [I]s Canada so fundamentally conflicted on carbon policy and hydrocarbon development that all it is able to achieve is protracted and unreasonable approval processes that result in inevitable terminations?[4]

The current impasse in getting approvals for major hydrocarbon export projects is sometimes compared to the federal government's 1980 National Energy Program, which McConaghy describes as "the great bête noir of Alberta economic ambitions."[5] However, as he notes, the NEP dealt with how to distribute the wealth from hydrocarbon production, "not whether hydrocarbon

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[1] *DYSFUNCTION* was reviewed in *Energy Regulation Quarterly*, Vol. 5, issue 2 June 2017, online: <http://www.energyregulationquarterly.ca/book-reviews/dysfunction-canada-after-keystone-xl-dennis-mcconaghy-dundurn-toronto-2017#sthash.pkN6aVNl.dpbs>.

[2] In 2018, Canada was the fourth largest oil producer and the fourth largest exporter of oil in the world: Natural Resources Canada. See Natural Resources Canada, *Crude Oil Facts,* August 2019 update, online: <https://www.nrcan.gc.ca/crude-oil-facts/20064#L1>. In 2017, Canada was the fourth largest producer of natural gas in the world, see Natural Resources Canada, *Natural Gas Facts,* August 2019 update, online: <https://www.nrcan.gc.ca/natural-gas-facts/20067>.

[3] Dennis McConaghy, *BREAKDOWN: **The Pipeline Debate and the Threat to Canada's Future*** (Toronto, Ontario: Dundurn, 2019) at 3.

[4] *Ibid*, at 8.

[5] *Ibid*, at 18.

production and its resulting economic value should be realized in the first place."[6] McConaghy suggests that the current federal government has revealed a "fundamental equivocation on the merits of hydrocarbon expansion"[7] but argues that, despite the polarization that has emerged, Canada "can, and must, find a consensus that balances credible and proportionate climate policy."[8]

BREAKDOWN is the latest in a series of valuable books detailing the challenges, even barriers, faced by proposed major oil and gas infrastructure projects in the recent past.[9] As McConaghy observes, by the end of 2018, only one Canadian-controlled market access option for oil, the Trans Mountain expansion project (TMX), remained in play – and it continued to face significant challenges. *BREAKDOWN* provides a valuable record of the demise of the Northern Gateway project (notwithstanding that it had received final Governor in Council approval) and the cancellation of TransCanada's proposed Energy East project midway through the regulatory process.

Much of the public controversy surrounding recent energy infrastructure projects has been focused on oil pipelines but, as *BREAKDOWN* records, natural gas export projects have similarly faced regulatory and political obstacles. In 2017, the Pacific North West LNG project was terminated notwithstanding that it had received final approval in 2016, subject to 190 conditions.[10] The Shell consortium's LNG Canada project, while approved and sanctioned, continues to face challenges.[11]

BREAKDOWN is an important further contribution to understanding both the details and the dynamics of these developments. For example, it poses puzzling questions about the Northern Gateway project as to why the proponents and the federal government were not more proactive in moving ahead with the project after it had been found to be in the national interest and before the 2015 federal election.[12] *BREAKDOWN* also provides a valuable account of the events, and negotiations, that led to the federal government's purchase of Trans Mountain and the TMX project.[13]

However, the real value of *BREAKDOWN* lies in the fact that, not only does McConaghy have a well-informed understanding of the challenges, he makes specific recommendations, *albeit* some with their own challenges. Part Two is boldly titled "Solutions."

It is worth noting here that McConaghy is no climate change denier:

> The nature of the climate change risk requires global collective and coordinated action; in my view, catastrophic impacts are possible without appropriate mitigation and adaptation policy responses.[14]

McConaghy proposes three core principles. The first should be patently obvious: "First, Canadian politicians must accept that any approval process is functionally useless if it fails to attract capital."[15] He asks, rhetorically, what is the point of any approval process if the private sector will not actually use it? Noting that environmental assessment is not an end in itself and only has purpose in the context of proposed development, he wonders if the Trudeau government understands "that basic reality."[16]

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[6] *Ibid*.

[7] *Ibid*, at 77.

[8] *Ibid*, at 5.

[9] See: *PIPE DREAMS: The Fight for Canada's Energy Future* (reviewed in *ERQ* Vol. 6, issue 4 2018, online: <http://www.energyregulationquarterly.ca/book-reviews/dysfunction-canada-after-keystone-xl-dennis-mcconaghy-dundurn-toronto-2017#sthash.pkN6aVNl.dpbs>; *THE PATCH: The People, Pipelines, and Politics of the Oil Sands* (reviewed in ERQ Vol. 7, issue 2 2019), online: <http://www.energyregulationquarterly.ca/book-reviews/the-patch-the-people-pipelines-and-politics-of-the-oil-sands-chris-turner#sthash.cwh89Hy2.dpbs>.

[10] Discussed in *BREAKDOWN,* see *supra* note 3 at 61 *et seq.*

[11] *Ibid*, at 169.

[12] *Ibid*, at 60-61.

[13] *Ibid*, at 103-105.

[14] *Ibid*, at 3.

[15] *Ibid*, at 127.

[16] *Ibid*, at 128.

Second, the government must provide clarity on policy, outside the approval process: "An approval process is *not* a forum for public policy debate."[17]

Third, Parliament should legislate to "clarify" rights to appeal regulatory decisions. Parliament should also legislate to clarify what constitutes adequate First Nations consultation and what constitutes justifiable infringement of Aboriginal title or claims to title.[18]

There may be some scope for Parliament to limit rights to appeal regulatory decisions. There is certainly some justification for McConaghy's complaint about the risk of "having apparent regulatory approvals undone for alleged process deficiencies long after the fact."[19]

McConaghy's plea to clarify Aboriginal rights by legislation would likely prove more problematic, given that those rights are grounded in constitutional law and therefore the scope and meaning of those rights are ultimately to be determined by the courts, rather than by legislated definition. A restricted definition by Parliament would inevitably be challenged, with its fate ultimately being settled by the courts, a point that McConaghy seems to, at least partly, concede.[20]

Given these three principles, McConaghy makes a compelling case that political sanction of major energy infrastructure projects must come at the beginning of the approval process, not at the end.[21] He asserts that President Obama knew he would never approve KXL long before he formally rejected the project in November 2015: "He did not clarify his intentions earlier because it was politically expedient not to."[22] Referring to Enbridge's ill-fated Northern Gateway project, he states "if no spill risk is to be countenanced in the Douglas Channel", say so before a regulatory application is filed and hundreds of millions of dollars are needlessly expended.[23]

By contrast, McConaghy observes that, under the recently implemented Bill C-69, "policy clarification comes implicitly embedded, if at all, in the final approval or rejection of a project, after a regulatory recommendation, subsequent to protracted regulatory process."[24]

BREAKDOWN is an important, well-written contribution to the ongoing debate about the future of Canada's petroleum industry in the age of existential concern about the potential effects of climate change. In addition to providing a valuable and insightful perspective on developments in the recent past, McConaghy proposes specific solutions for moving forward and building "a consensus that balances credible and proportionate climate policy."[25] ■

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[17] *Ibid*, at 129.
[18] *Ibid*.
[19] *Ibid*, at 167.
[20] *Ibid*, at 162.
[21] *Ibid*, at 129.
[22] *Ibid*, at 131.
[23] *Ibid*, at 133.
[24] *Ibid*, at 131.
[25] *Ibid*, at 5.